POLARAD

HANDBOOK OF OPERATING AND MAINTENANCE INSTRUCTIONS

POLARAD ELECTRONIC INSTRUMENTS,
DIVISION OF POLARAD ELECTRONICS CORPORATION
34-02 QUEENS BLVD., LONG ISLAND CITY 1, N. Y.

POLARAD®

INSTRUCTION MANUAL

TUNING UNITS

MODEL T-RKS
(9.85 TO 15.35 GC)

MODEL T-RKU
(14.80 TO 21.00 GC)

PART OF THE TR SYSTEM

THIS HANDBOOK COVERS TUNING UNIT SERIAL NOS. 1-1 AND UP

POLARAD ELECTRONIC INSTRUMENTS
A DIVISION OF POLARAD ELECTRONICS CORPORATION
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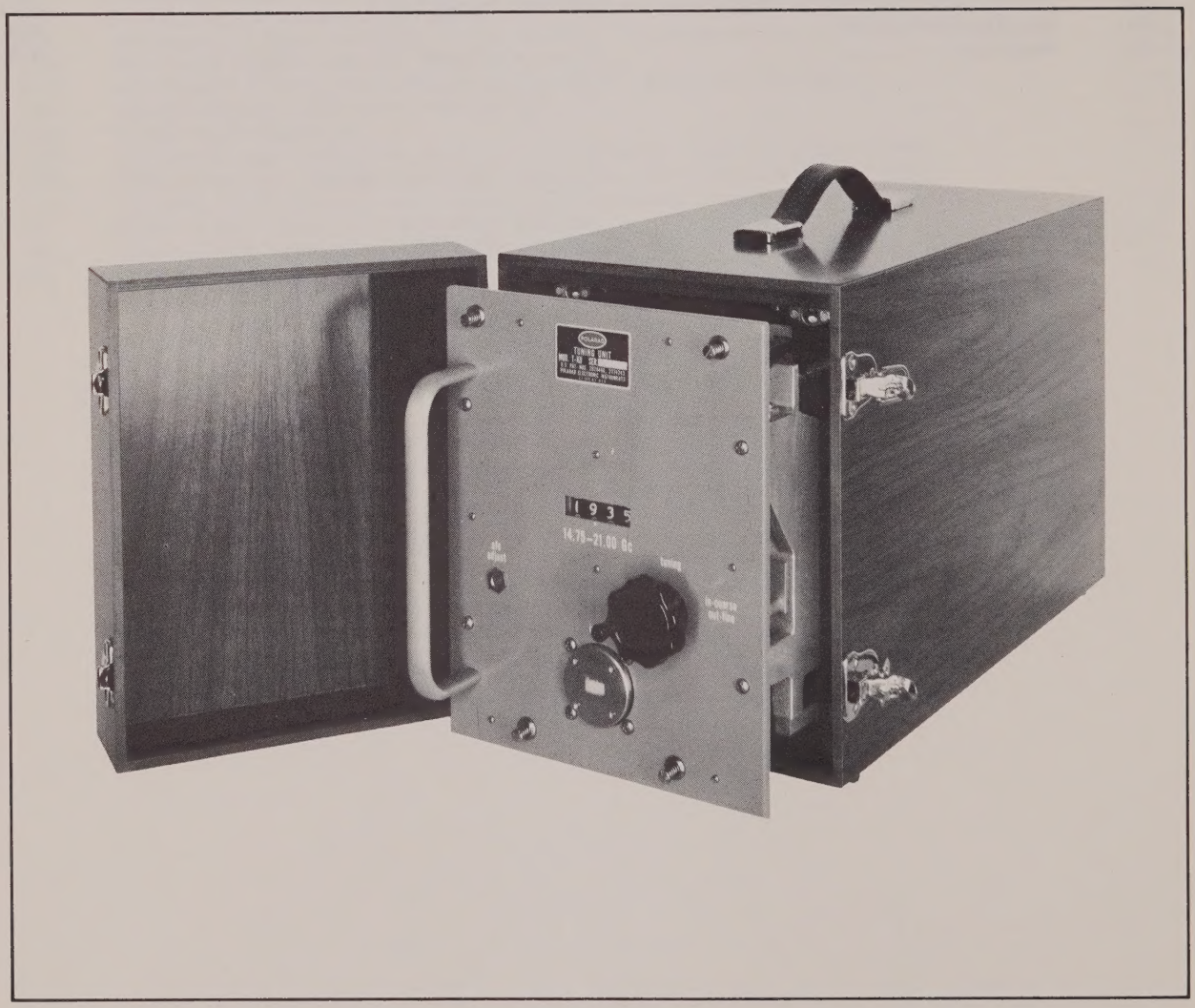


Figure 1-1. Model T-RKS Tuning Unit

SECTION I
INTRODUCTION

1-1. SCOPE OF HANDBOOK.

1-2. This handbook contains instructions for the use and maintenance of the Models T-RKS and T-RKU Tuning Units (see figure 1-1), manufactured by the Polarad Electronic Instruments Division of Polarad Electronics Corporation, Long Island City, New York. The handbook includes a general description of the tuning units, operating instructions, theory of operation, maintenance information, schematic diagrams, and a parts list.

Note

Refer to the Handbook of Operating and Maintenance Instructions for the Model TR Calibrated Field Intensity Receiver for information concerning the Model T-B Basic Unit.

1-3. PURPOSE AND USE OF THE EQUIPMENT.

1-4. The Models T-RKS and T-RKU Tuning Units (hereafter referred to as the T-RKS and T-RKU, respectively) are plug-in tuning units which extend the upper frequency limit of the Model Calibrated Field Intensity Receiver to 21.00 gc.

1-5. OPTIONAL EQUIPMENT.

1-6. Table 1-1 lists the optional equipment available for use with the T-RKS and/or T-RKU.

1-7. ELECTRICAL CHARACTERISTICS.

1-8. The electrical characteristics peculiar to the T-RKS and T-RKU are listed in Table 1-2.

1-9. ELECTRON TUBE AND SEMICONDUCTOR COMPLEMENT.

1-10. Table 1-3 lists the types and functions of the electron tubes and semiconductors employed in the T-RKS and T-RKU.

TABLE 1-1. OPTIONAL EQUIPMENT

Component	Polarad Part Number	Polarad Model Number
Calibrated Omnidirectional Antenna	C148050	CA-KSO
Calibrated Omnidirectional Antenna	C143947	CA-KUO
Calibrated Directional Feedhorn	C143957	CA-KS
Calibrated Directional Feedhorn	C148061	CA-KU
Parabolic Reflector	D143090	CA-R2
Antenna Tripod	A117208	CA-T
Flexible Waveguide	B701778	WKS
Flexible Waveguide	B701779	WKU

TABLE 1-2. ELECTRICAL CHARACTERISTICS

Characteristic	Specification
Frequency range: Model T-RKS Model T-RKU	 9.85 to 15.35 gc 14.80 to 21.00 gc
R-f sensitivity*: Model T-RKS Model T-RKU	 -80 dbm, minimum -77 dbm, minimum
Maximum r-f input signal	+22.5 dbm
R-f attenuator accuracy	±0.5 db
Input flange: Model T-RKS Model T-RKU	 WR-75 WR-51

* Signal plus noise equal to twice noise @ 1 mc impulse bandwidth.

TABLE 1-3. ELECTRON TUBE AND SEMICONDUCTOR COMPLEMENT

Reference Symbol Number	Electron Tube or Semiconductor Type	Function
Model T-RKS Tuning Unit		
CR1601	1N2510	First mixer
CR1602	HV-20C-2	Protective diode
CR1603*	1N3195	Half-wave rectifier
V1601	ZV1011/8052	Local oscillator
Model T-RKU Tuning Unit		
CR1701	1N2510	First mixer
CR1702	HV-20C-2	Protective diode
CR1703*	1N3195	Half-wave rectifier
V1701	ZV1011/8052	Local oscillator

* Employed only in tuning units with motor drive capability.

SECTION II
OPERATION

2-1. GENERAL

2-2. The T-RKS and/or T-RKU is shipped either packaged in its storage container or installed in the Model TR; in either case the tuning unit is ready for use. The equipment should be unpacked upon receipt, observing the usual precautions customary when handling electronic equipment.

2-3. INSTALLATION.

2-4. To install the T-RKS or T-RKU into the basic unit, proceed as directed in the following steps.

a. With operating power removed from the equipment, place the rear of the tuning unit into the basic unit front panel opening and slide the tuning unit into the basic unit.

b. Secure the tuning unit to the basic unit by turning each of the four tuning unit captive-lock fasteners one-quarter turn clockwise.

2-5. OPERATION.

2-6. The procedures for proper operation of the Model TR Calibrated Field Intensity Receiver with either a T-RKS or T-RKU installed are described in the basic manual.

2-7. OPERATING CONTROLS, INDICATORS, AND CONNECTORS. The operating controls, indicators, and connectors of the T-RKS and T-RKU are shown in figure 2-1; their functions are described in Table 2-1.

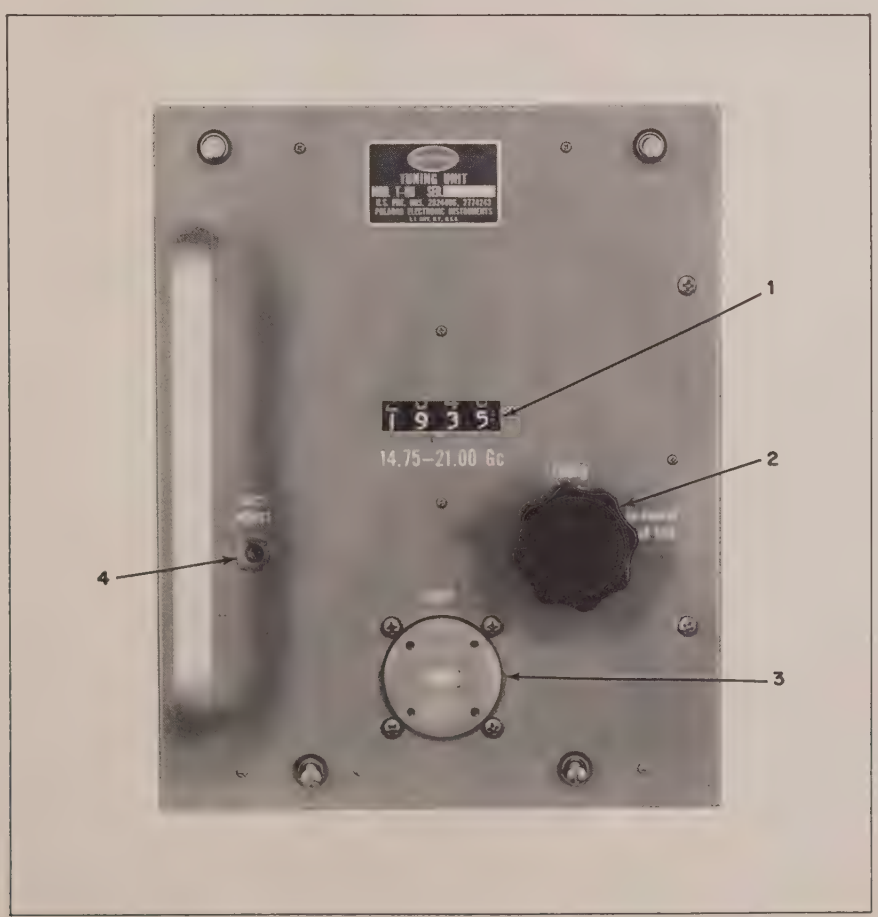


Figure 2-1. Operating Controls, Indicators, and Connectors

TABLE 2-1. OPERATING CONTROLS, INDICATORS AND CONNECTORS

	Figure 2-1 Index No.	Function
Frequency Gc counter	1	Indicates the frequency (±1%) to which receiver is tuned
TUNING control	2	Permits tuning of receiver (two positions - COARSE and FINE)
RF INPUT flange	3	Port which couples the applied signal to the waveguide transfer switch
MOTOR DRIVE ON OFF switch*	Not Shown	Permits automatic scanning of the tuning unit band
AFC ADJUST control	4	Sets afc amplifier bias voltage

* Optional

SECTION III
THEORY OF OPERATION

3-1. GENERAL.

3-2. The Models T-RKS and T-RKU Tuning Units differ from the four lower-frequency tuning units of the TR system (T-RL, T-RM, and T-RX) in that the former employ triple-cavity preselectors.

3-3. BLOCK DIAGRAM ANALYSIS.

(See figure 3-1).

3-4. The r-f signal under measurement is coupled through the RF INPUT port and is applied to a tunable three-cavity preselector. The preselector, which is a tunable narrow bandpass filter at the input of the receiver, couples that portion of the signal falling within the pass band to a crystal diode first mixer. R-f energy from a tunable klystron local oscillator, tracked in conjunction with the preselector so that the second harmonic of the oscillator is 260 mc below the output of the preselector, is simultaneously applied to the first mixer. The 260 mc first i-f signal is developed by the non-linear characteristic of the diode.

3-5. The first i-f signal is then coupled through a mixer matching network and applied to the remainder of the i-f circuitry located in the Model T-B Basic Unit.

TABLE 3-1. TUNING UNIT DIFFERENCE DATA

	Tuning Unit	
	Model T-RKS	Model T-RKU
Frequency range	9.85 to 15.35 gc	14.80 to 21.00 gc
Local oscillator:		
Tube type	Polarad ZV1011/8052 Velocitron®	Polarad ZV1011/8052 Velocitron®
Frequency range[1]	4.795 to 7.545 gc	7.270 to 10.370 gc
Harmonic employed	Second (2x fundamental)	Second (2x fundamental)
Harmonic frequency range	9.59 to 15.09 gc	14.54 to 20.74 gc
Mode switching	Required	Required
Reflector modes employed	2-3/4 λ from 4.795 to 5.920 gc; 3-3/4 λ from 5.920 to 7.545 gc	3-3/4 λ from 7.270 to 8.970 gc; 3-3/4 λ from 8.970 to 10.370 gc
Cavity mode	3/4 λ	3/4 λ
Beam supply voltage[2]	-1250 volts	-1250 volts
Reflector supply voltage[2]	-1850 volts	-1850 volts
Beam current	20 milliamperes	20 milliamperes
Control grid voltage[3, 4]	+3 to +10 volts	+3 to +10 volts
Preselector:		
Number of cavities	3	3
Cavity modes	11/4, 13/4, and 15/4 λ	13/4, 15/4, and 17/4 λ

1. Fundamental.
2. With respect to ground.
3. With respect to beam voltage.
4. Adjusted to obtain proper beam current.

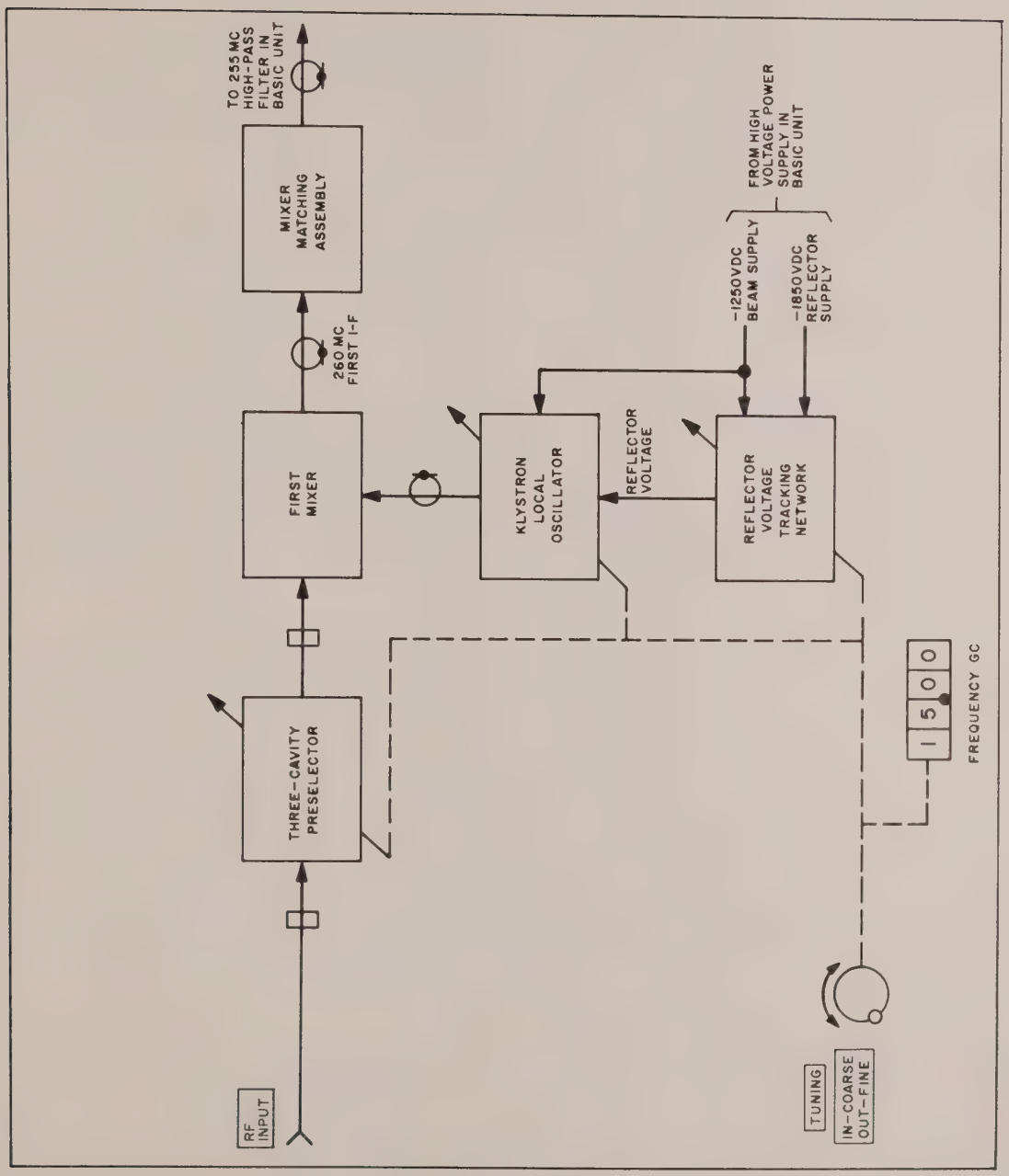


Figure 3-1. Models T-RKS and T-RKU Tuning Units, Detailed Block Diagram

SECTION IV

MAINTENANCE

4-1. GENERAL.

4-2. This section contains maintenance and alignment procedures for the T-RKS and T-RKU. Included are a list of required test equipment, minimum performance standards, and alignment procedures necessary to restore the tuning units to original operating condition after the required repairs have been effected.

4-3. TEST EQUIPMENT REQUIRED.

4-4. The test equipment required for the maintenance of the T-RKS and T-RKU are listed in table 4-1.

4-5. PRELIMINARY INSPECTION.

4-6. Perform a preliminary visual and manual inspection of the tuning unit before undertaking any maintenance operation. Remove line power from the equipment before removing the tuning unit from the basic unit. Withdraw the tuning unit and examine it for loose or damaged parts, dust, dirt, grease and oil, and corrosion. Correct such conditions before proceding with maintenance.

Note

Do not disturb the settings of any screwdriver-adjusted potentiometers.

4-7. MINIMUM PERFORMANCE STANDARDS.

4-8. The minimum performance standards listed in table 4-3 is an aid to determine whether the T-RKS and/or T-RKU is operating within the specifications stated in paragraph 1-7. Failure of the equipment to provide the designated "Normal Indication" signifies that the tuning unit is not operating properly and reference should be made to the applicable repair, replacement, and/or alignment procedures. Set the front panel controls as indicated in table 4-2 prior to performing the minimum performance standards check.

Note

Proper operation of the T-RKS and/or T-RKU requires that the Model T-B Basic Unit is in proper operating condition.

4-9. REPLACEMENT PROCEDURES.

4-10. The procedures for replacing major components within the T-RKS and T-RKU are given in paragraphs 4-11 through 4-18. Component locations are shown in figures 4-2 through 4-5.

Note

The information contained within parenthesis applies to the Model T-RKU Tuning Unit and immediately follows the data applicable to the Model T-RKS Tuning Unit.

4-11. REPLACEMENT OF FIRST MIXER CARTRIDGE DIODE. To replace the first mixer cartridge diode, proceed as directed in the following steps.

a. With line power removed from the equipment and the tuning unit withdrawn from the basic unit, unscrew XCR1601 (XCR1701) from the mixer assembly.

b. Remove the cartridge diode from its seat within the mixer. Should the inner parts of the mixer come out as the diode is withdrawn, replace them into the mixer before inserting a replacement diode. See figure 4-6. Withdrawal of the diode may cause the center conductor within the mixer to shift. If this occurs, press the center conductor back into proper mating position with a blunt object, to insure proper contact with P1601 (P1701).

c. Replace the diode with an operational type IN2510 crystal.

d. Replace XCR1601 (XCR1701) to the mixer assembly.

Note

Replacement of the first mixer diode will necessitate adjustment of the mixer matching network. Refer to paragraph 4-17.

4-12. REPLACEMENT OF LOCAL OSCILLATOR PROBE. To replace the local oscillator probe, proceed as directed in the following steps.

a. With line power removed from the equipment, withdraw the tuning unit from the basic unit.

CAUTION

DO NOT TWIST CABLE W1604 (W1704).

b. Disconnect P1601 (P1701) from its mating receptacle on the mixer assembly.

c. Loosen the two probe collar cap screws to free the probe. Grasp the neck of the probe and carefully withdraw the probe from the cavity pipe.

d. Loosen the single setscrew that secures the probe collar to the cavity pipe. Press the collar toward the cavity barrel so that the collar is properly

TABLE 4-1. TEST EQUIPMENT REQUIRED

Nomenclature	Manufacturer and Model No.	Use
Adapter	Automatic Type NT1100	Retracking local oscillator
Crystal Detector	PRD Model 613-M	Retracking local oscillator
Flexible Waveguide	Polarad Model WKS	Minimum performance standards
Flexible Waveguide	Polarad Model WKU	Minimum performance standards
Frequency Meter	FXR Model N414A	Retracking local oscillator
Frequency Meter	Waveline Model 698-DR	Minimum performance standards
Frequency Meter	Waveline Model 798-DR	Minimum performance standards
Frequency Meter	Waveline Model 898-DR	Minimum performance standards
Klystron Mode Alignment Modulator	Polarad Model MK-1	Retracking local oscillator
Microwave Power Meter	Narda Model 440	Minimum performance standards
Microwave Signal Generator	Polarad Model 1709	Minimum performance standards
Microwave Signal Generator	Polarad Model 1710	Minimum performance standards
Multimeter (2 req'd)	Simpson Model 260	Retracking local oscillator
Oscilloscope	Tektronix Model 545A	Retracking local oscillator
Preamplifier	Tektronix Type K	Retracking local oscillator
Test Lead	Pomona Model 2BC-UHF-30	Retracking local oscillator
Test Lead	Pomona Model 2BC-PP-36	Retracking local oscillator
Thermistor	Narda Model 339	Minimum performance standards
Thermistor Mount	Narda Model 540	Minimum performance standards
Thermistor Mount	Narda Model 539	Minimum performance standards
Thermistor Mount	Narda Model 538	Minimum performance standards
Waveguide Transition	Waveline Model 7594-A	Minimum performance standards
Waveguide Transition	Waveline Model 7594-C	Minimum performance standards
Waveguide Transition	Waveline Model 5194-A	Minimum performance standards
Waveguide Transition	Waveline Model 5194-E	Minimum performance standards

TABLE 4-2. PRELIMINARY CONTROL SETTINGS FOR MINIMUM PERFORMANCE STANDARDS CHECK

Front Panel Control	Setting
Model T-C Field Intensity Calibrator	
CALIBRATE USE switch	USE
IF ATTENUATION DECIBELS switches	All down
Model T-B Basic Unit	
IMPULSE BANDWIDTH-MC switch	1
WEIGHTING FUNCTION switch	AVG
Scale Selector switch	XTAL MA
SLIDEBACK control	Fully counterclockwise
IF GAIN control	Fully counterclockwise
AM FM switch	AM
AURAL AID OFF switch	OFF
AFC OFF switch	OFF
AUDIO GAIN control	Fully counterclockwise
POWER OFF switch	OFF
Model T-RKS or T-RKU Tuning Unit	
MOTOR DRIVE ON OFF switch*	OFF

* Contained only in units employing motor drive.

TABLE 4-3. MINIMUM PERFORMANCE STANDARDS

Step	Purpose	Procedure	Normal Indication	Abnormal Indication Reference
1	To evaluate first mixer crystal current	With controls set as listed in table 4-2, energize the equipment and allow a three minute warmup. Rotate the TUNING control throughout the band and note the output meter indication on the XTAL MA scale.	Output meter pointer deflects smoothly over scale (except for possible abrupt jump at mode switching point) as the TUNING control is rotated throughout the band. Minimum output meter indication is 0.5 Allow the equipment to warm up for at least 10 minutes. Set the Scale Selector switch to ZERO and, if necessary, adjust the Zero control to obtain an output meter pointer deflection of CAL. Proceed to step 2.	First mixer cartridge diode inoperative. Refer to paragraph 4-11. Local oscillator reflex klystron tube inoperative. Refer to paragraph 4-12. Local oscillator improperly tracked. Refer to paragraph 4-13. Mixer matching network improperly aligned. Refer to paragraph 4-17. Local oscillator probe defective. Refer to paragraph 4-12.
2	To check receiver frequency accuracy, frequency range, and sensitivity	Set the Scale Selector switch to LIN and adjust the IF GAIN control to obtain an output meter indication of 3 on the LIN scale. Connect a microwave signal generator to a power meter, as shown in figure 4-1a. Adjust the signal generator to obtain a 0 dbm cw output (as determined) by the power meter) at a frequency corresponding to the low end of the band of the tuning unit under test. Reduce the signal generator output level to approximately -70 dbm and connect the equipment as illustrated in figure 4-1b. Rotate the TUNING control to obtain an output meter indication of maximum deflection.	Tuning unit under test shall be continuously tunable throughout its specified range, as indicated below: Tuning Unit | Frequency Range Model T-RKS | 9.85 to 15.35 gc Model T-RKU | 14.80 to 21.00 gc Accuracy of Frequency Gc counter, as determined by equation below, shall be equal to or better than ±1% throughout the band. $\text{Accuracy (\%)} = \frac{f_{fm} - f_{counter}}{f_{fm}} \times 100$ where f_{fm} is the frequency meter indication, in gc, and $f_{counter}$ is the Frequency Gc counter indication.	Local oscillator improperly tracked. Refer to paragraph 4-13. Preselector improperly tracked. Refer to paragraph 4-15. Same as above.

(Cont'd)

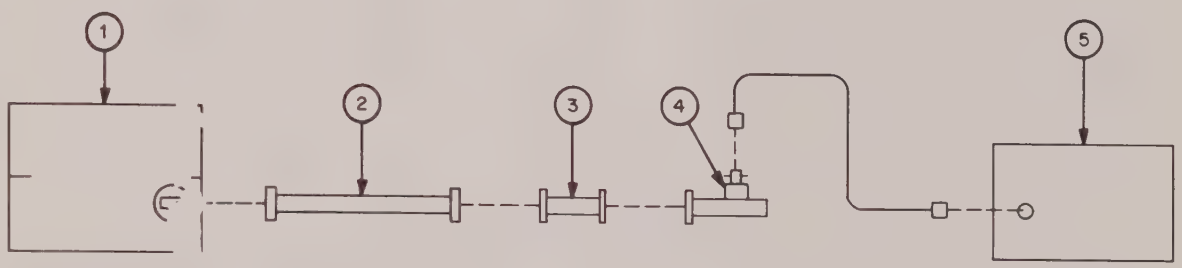
TABLE 4-3. MINIMUM PERFORMANCE STANDARDS (Cont'd)

Step	Purpose	Procedure	Normal Indication	Abnormal Indication Reference
2 (Cont'd)	To check receiver frequency accuracy, frequency range, and sensitivity (cont'd).	**Note** Should the output meter pointer deflect to an off-scale indication, reduce the signal generator output level to obtain an on-scale indication. Note the Frequency Gc counter indication. Adjust the signal generator for minimum output level (≈ -100 dbm) and set the IF GAIN control to obtain an output meter pointer indication of 2 on the LIN scale. Carefully increase the signal generator output level to obtain an output meter pointer indication of 2.8 on the LIN scale. Note the signal level (in -dbm) required for this indication. This level is the sensitivity of the Model TR at the test frequency. Increase the signal level and insert the frequency meter into the signal line. Tune the frequency meter to obtain a dip in the output meter indication. Note this frequency. Repeat the above procedure in 400 mc increments throughout the band.	Sensitivity of the receiver shall be equal to or better than the values listed below: Tuning Unit | Sensitivity Model T-RKS | -80 dbm Model T-RKU | -77 dbm Set the Scale Selector switch to μV, the WEIGHTING FUNCTION switch to PEAK, and proceed to step 3.	Same as above. Mixer matching network improperly aligned. Refer to paragraph 4-17.
3	To evaluate calibration signal.	Connect the microwave signal generator to a power meter, as illustrated in figure 4-1a. Adjust the signal generator to obtain a 0 dbm cw output (as determined by the power meter) at a frequency corresponding to the low end	Calibration signal intensity is -57 dbm/mc ±2 db throughout the band.	Charging voltage and/or driving circuitry inoperative. Refer to Model CFI handbook. Impulse generator not calibrated. Refer to paragraph 4-20.

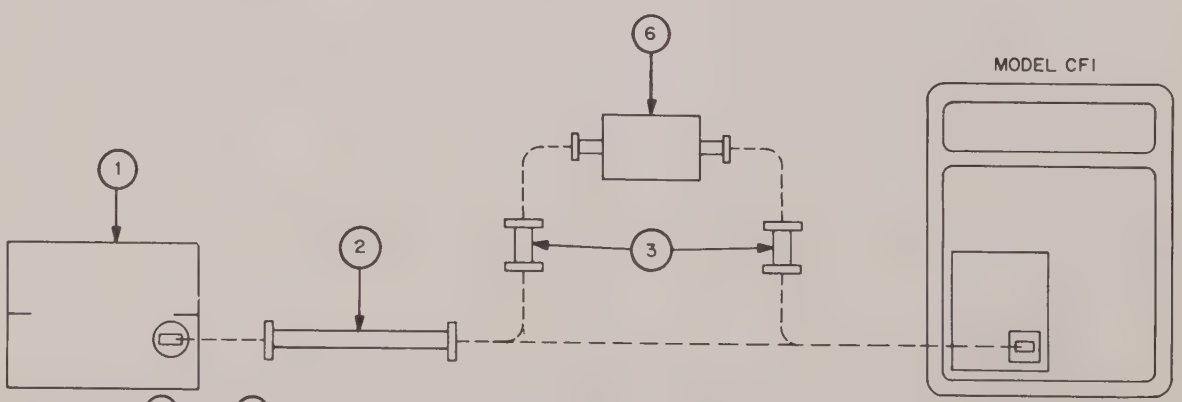
(Cont'd)

ITEM	MODEL T-RKS	MODEL T-RKU
1	Polarad Model 1709 Microwave Signal Generator	Polarad Model 1710 Microwave Signal Generator
2	Polarad Model WKS Flexible Waveguide	Polarad Model WKU Flexible Waveguide
3	Waveline Models 7594-A and 7594-C Waveguide Transitions	Waveline Models 5194-A and 5194-E Waveguide Transitions
4	Narda Models 540* and 539 Thermistor Mounts	Narda Models 539 and 538 Thermistor Mounts
5	Narda Model 440 Microwave Power Meter	Narda Model 440 Microwave Power Meter
6	Waveline Models 698-DR and 798-DR Frequency Meters	Waveline Models 798-DR and 898-DR Frequency Meters

* With Narda Model 336 Thermistor



(A) CALIBRATING SIGNAL GENERATOR OUTPUT LEVEL



NOTE: ITEMS (3) AND (6) OF (B) INSERTED *ONLY* TO ASCERTAIN SIGNAL FREQUENCY

(B) APPLYING CALIBRATED SIGNAL

Figure 4-1. Minimum Performance Standards, Equipment Setup.

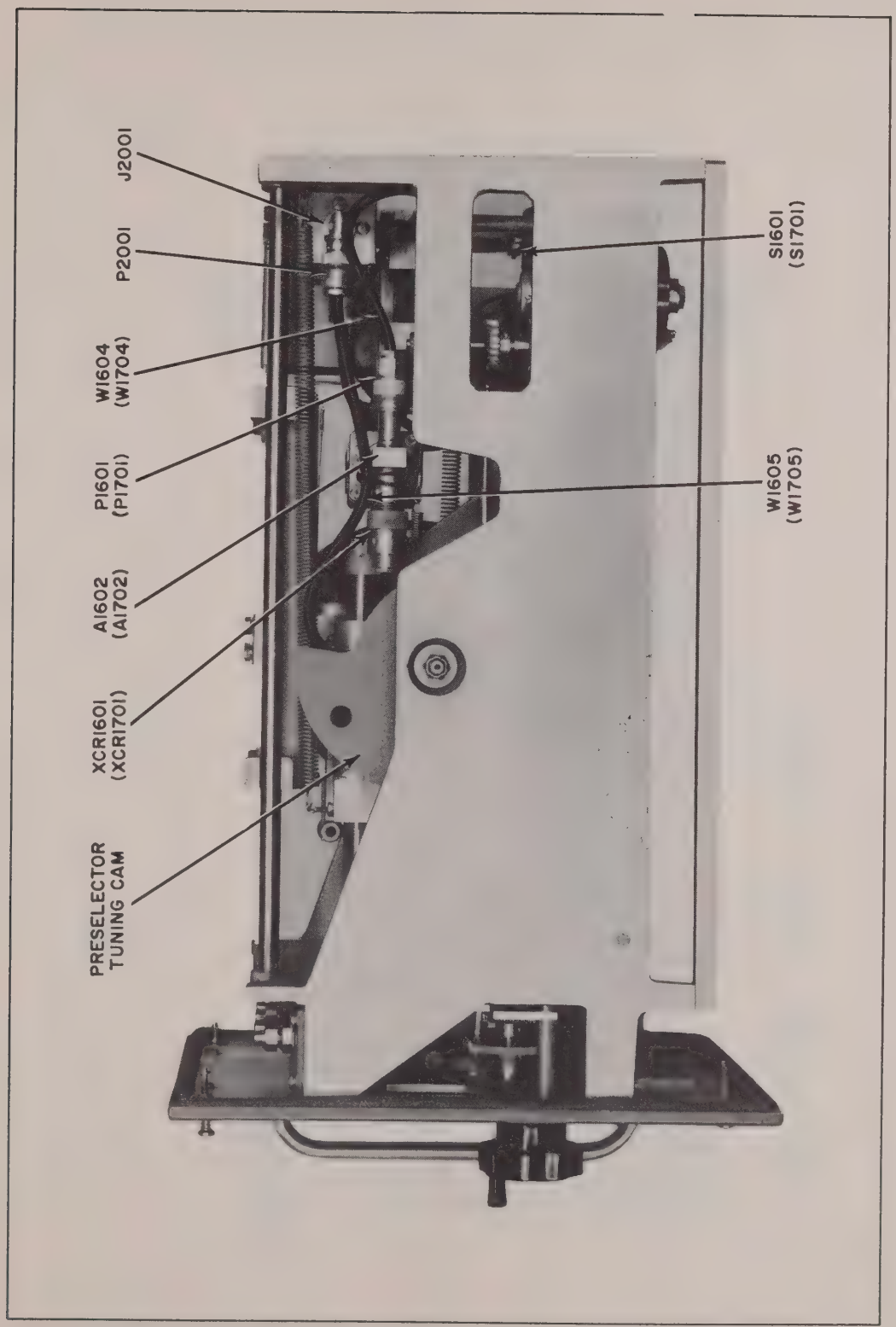


Figure 4-2. Typical Tuning Unit, Right Side View

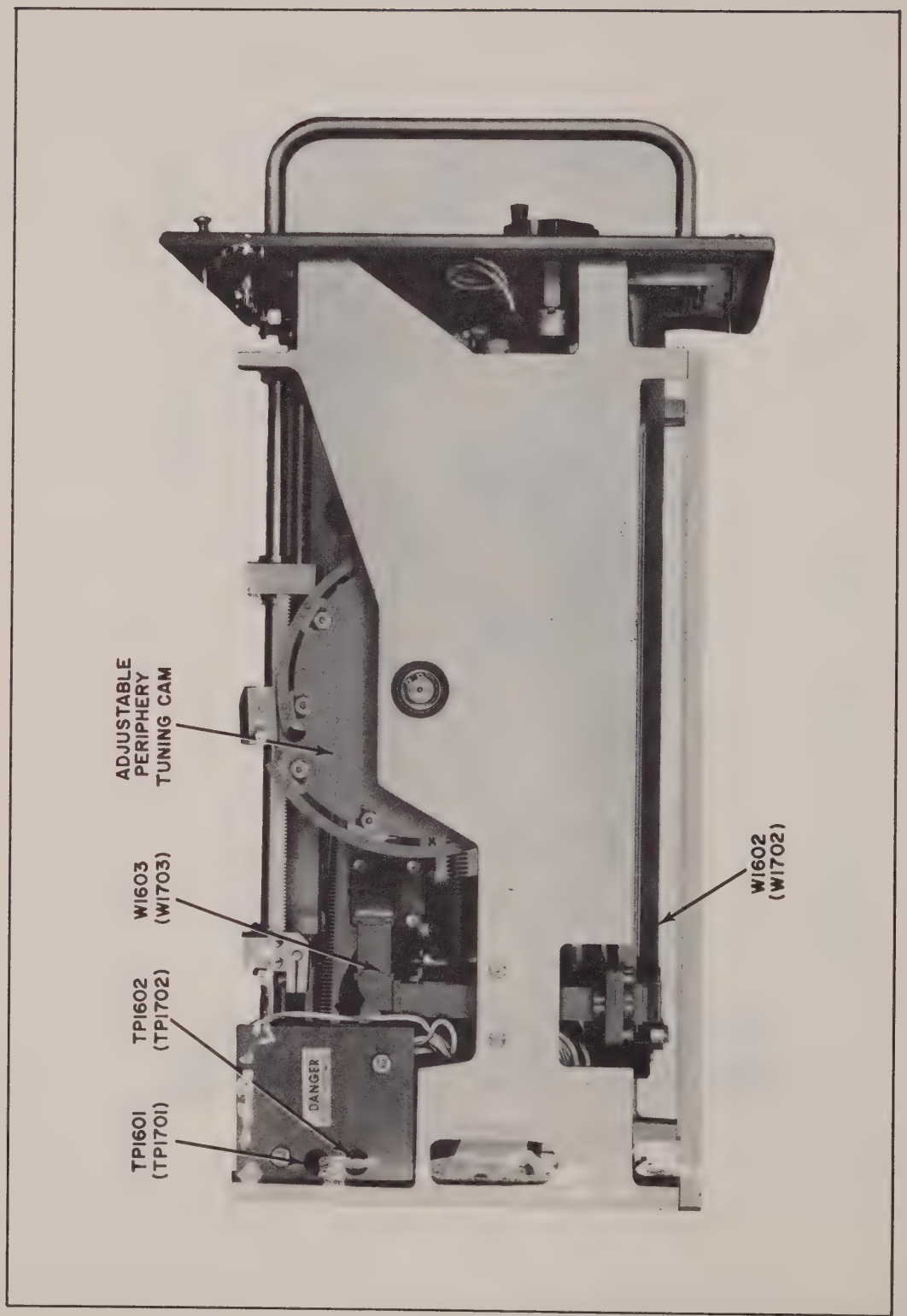


Figure 4-3. Typical Tuning Unit, Left Side View

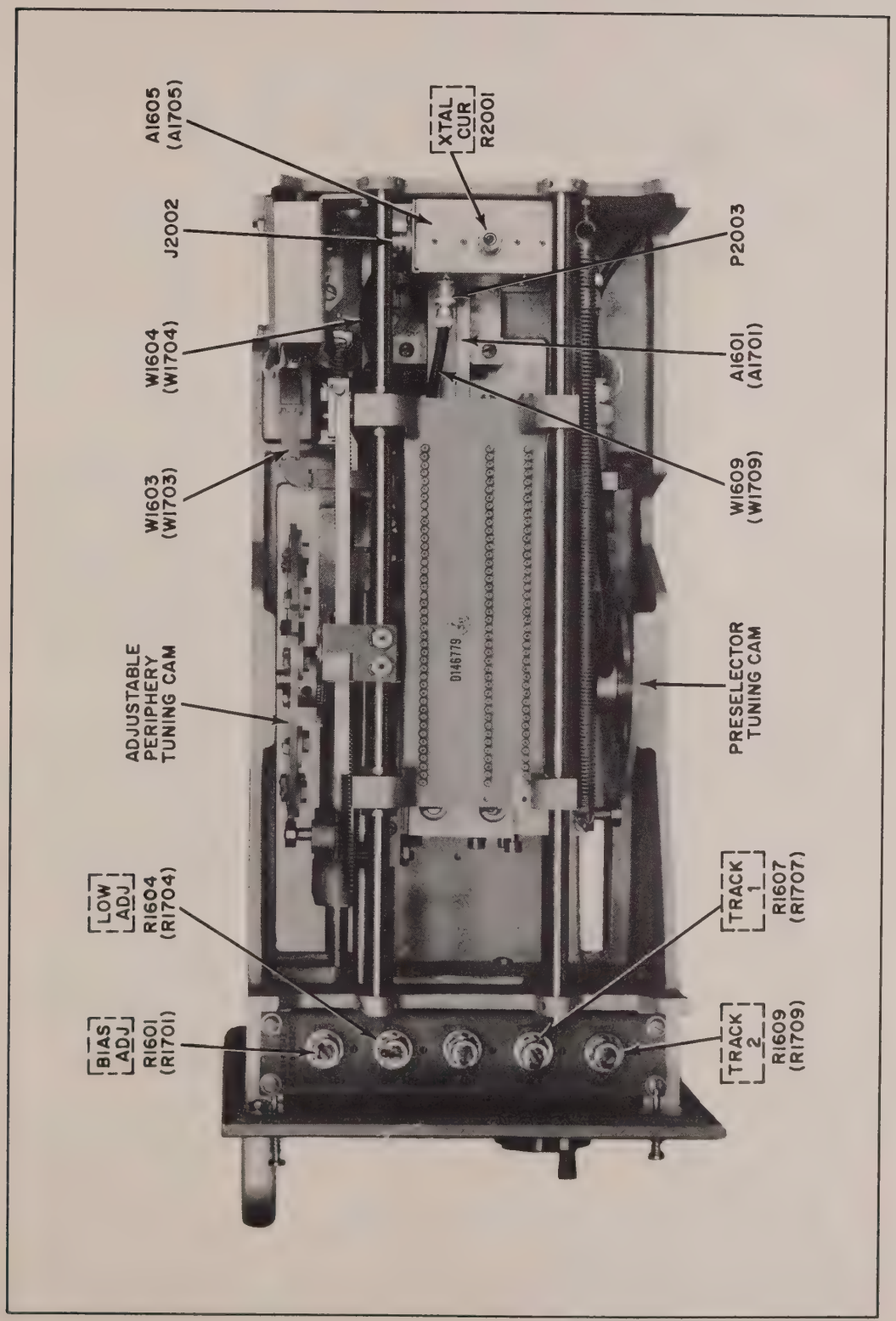


Figure 4-4. Typical Tuning Unit, Top View

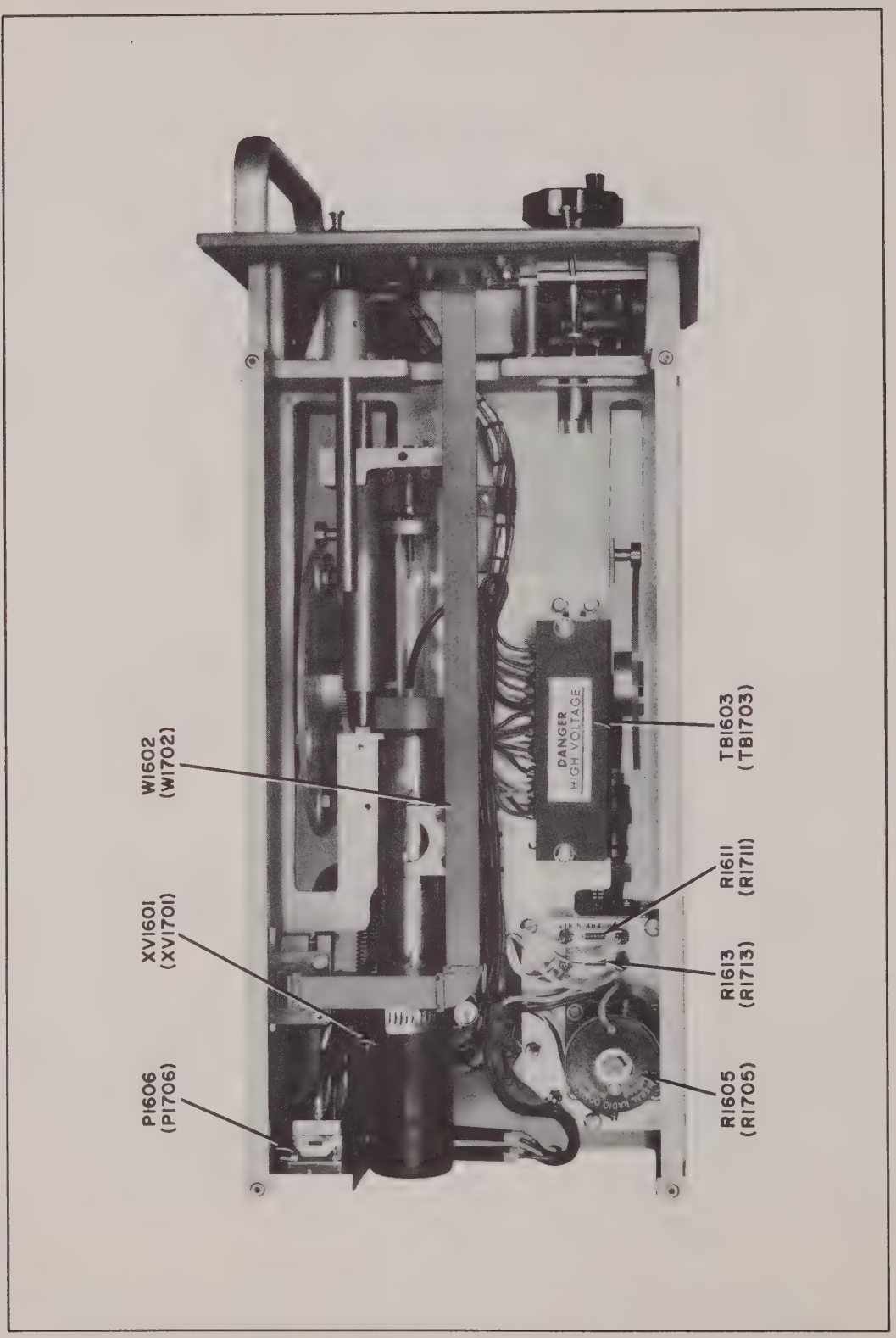


Figure 4-5. Typical Tuning Unit, Bottom View

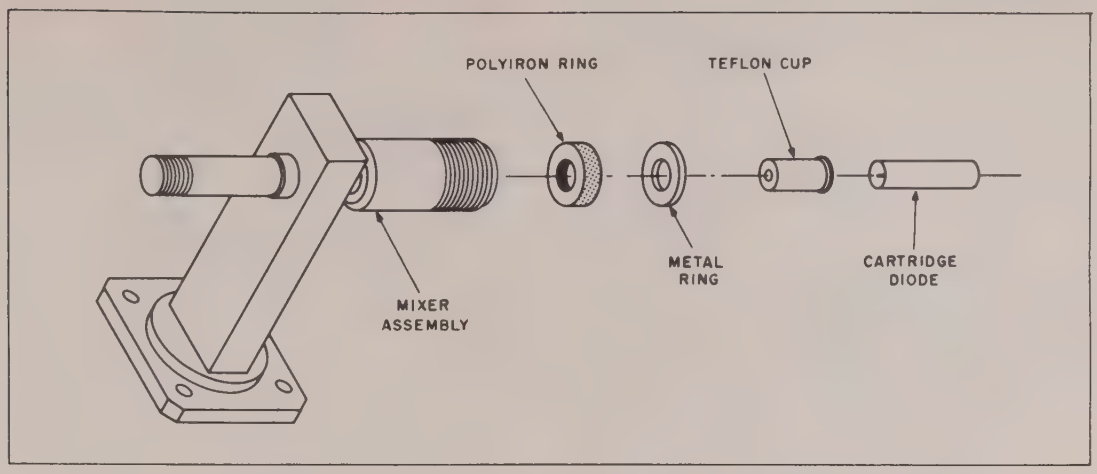


Figure 4-6. Mixer Assembly, Exploded View

seated on the cavity pipe. Tighten the setscrew to lock the probe collar in this position. See figure 4-7.

e. Orient a replacement local oscillator probe so that the ground point of the probe tip faces the front of the tuning unit. Insert the probe through the collar and into the cavity pipe so that the probe shoulder is 1/4-inch from the top of the probe collar. See figure 4-7. Tighten the two cap screws to fix the probe in this position.

f. Connect patch cable W35 between the tuning unit and the basic unit. To insure proper ventilation within the equipment, secure dummy panel MP1113 over the basic unit front panel opening created by the removal of the tuning unit.

g. Connect a PRD Model 613-M Crystal Detector between P1601 (P1701) and the vertical input of an oscilloscope, as illustrated in figure 4-8.

h. Perform step c of paragraph 4-14.

i. With the AFC OFF switch set to OFF, energize the equipment and allow a 15 minute warmup. Rotate the TUNING control to obtain a Frequency Gc counter indication corresponding to the high end of the band.

j. Perform step k of paragraph 4-14.

k. Loosen the collar cap screws and adjust the insertion of the probe until the mode starts to narrow. Withdraw the probe approximately 1/16-inch and tighten the two cap screws to lock the probe in this position.

l. Scan the band to ascertain that the mode does not collapse or split at any point.

m. De-energize the equipment and disconnect from the setup of figure 4-8.

n. Connect P1601 (P1701) to its mating receptacle on the mixer assembly.

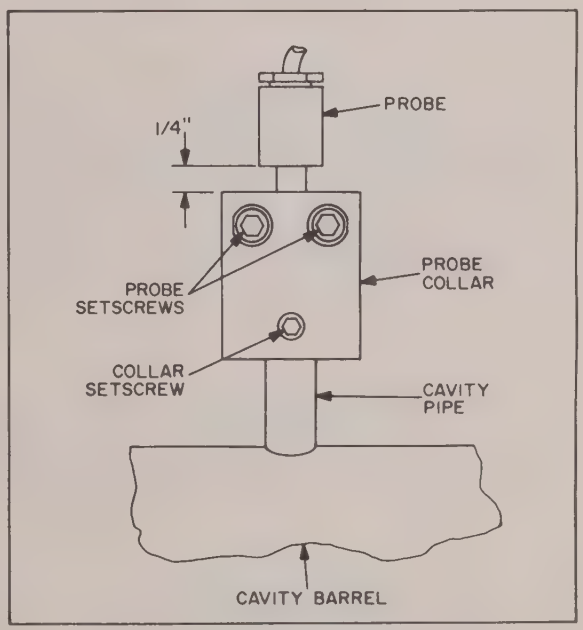


Figure 4-7. Positioning Local Oscillator Probe

4-13. REPLACEMENT OF REFLEX KLYSTRON TUBE. To replace the reflex klystron tube, proceed as directed in the following steps.

WARNING

HIGH VOLTAGES EXIST AT THE REFLEX KLYSTRON TUBE SOCKET WHEN THE MODEL TR IS ENERGIZED. BE SURE TO DE-ENERGIZE THE EQUIPMENT AND REMOVE IT FROM LINE POWER BEFORE ATTEMPTING TO REPLACE THE REFLEX KLYSTRON TUBE.

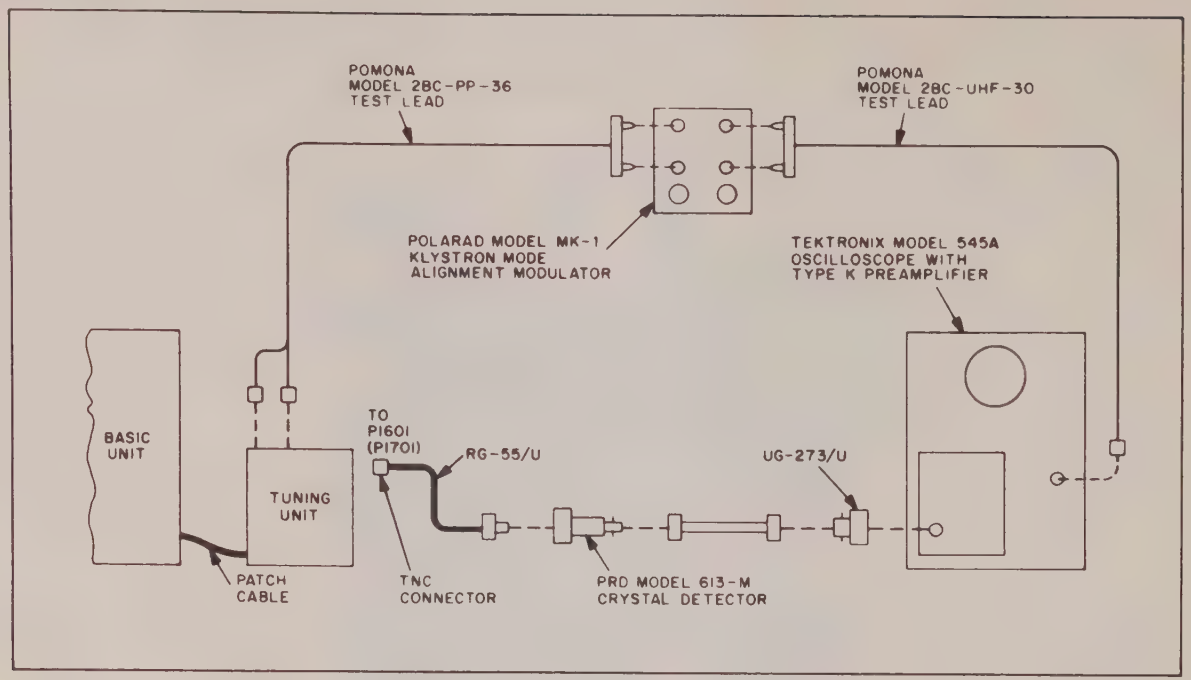


Figure 4-8. Adjustment of Local Oscillator Probe Insertion, Equipment Setup

a. With line power removed from the equipment, withdraw the tuning unit from the basic unit and loosen the clamp screw that secures the protective shield to the cavity end collar. Carefully remove the protective shield from its mounting. The knurled end collar, tube socket, and base of the reflex klystron tube will now be visible and accessible.

b. Carefully remove the tube socket from the base pins of the reflex klystron tube.

c. Adjust spanner wrench MP1104 so that it engages two holes in the face of the end collar. Rotate the spanner wrench to loosen the end collar. Disengage the wrench and rotate the end collar one or two turns by hand.

Note

Do not remove the end collar from the cavity barrel. The base of the reflex klystron tube protrudes far enough to permit the technician to grasp it.

d. Grasp the protruding base of the reflex klystron tube and, with a clockwise twisting motion, carefully withdraw the tube from the cavity.

e. Insert a replacement Polarad Model ZV1011/8052 Velocitron® into the cavity, applying a clockwise twisting motion to the base of the tube as it enters the cavity. Two slight but distinct resistances will be felt as the tube contact rings engage the toroidal springs within the cavity. Continue twisting the tube, while simultaneously pressing it further into the cavity, until a positive stop is encountered. At this point the tube is properly seated within the cavity.

f. Tighten the end collar.

CAUTION

NEVER USE FORCE WHEN MATING THE TUBE SOCKET TO THE BASE PINS OF THE REFLEX KLYSTRON TUBE. FORCED MATING OF THE SOCKET IN AN IMPROPERLY ORIENTED POSITION WILL RESULT IN THE DESTRUCTION OF THE REFLEX KLYSTON TUBE UPON APPLICATION OF POWER.

g. Mate the tube socket to the base pins of the reflex klystron tube and replace the protective shield so that the open end of the shield covers the knurled end collar. Tighten the clamp screw to secure the protective shield to the end collar.

h. Set Bias Adj control R1601 (R1701) fully counterclockwise.

i. Refer to paragraph 4-14 for the reflector voltage tracking procedure to be employed after replacement of the reflex klystron tube.

4-14. RETRACKING LOCAL OSCILLATOR.

4-15. Due to variations in characteristics between reflex klystron tubes, replacement of the local oscillator tube will necessitate retracking. The retracking procedure is described in the following steps.

WARNING

MAINTENANCE PERSONNEL MUST BE CONSTANTLY AWARE OF THE HIGH VOLTAGES EXISTING WITHIN AN ENERGIZED TUNING UNIT.

BE SURE TO USE HIGH-VOLTAGE GLOVES AND WELL-INSULATED HAND TOOLS WHEN MAKING ADJUSTMENTS TO AN ENERGIZED TUNING UNIT.

OBSERVE EXTREME CAUTION AT ALL TIMES.

Note

The information contained within parenthesis applies to the T-RKU, and immediately follows the-data applicable to the T-RKS.

a. With the Model TR installed in its dust cover and with line power removed from the equipment, remove the tuning unit from the basic unit and connect patch cable W35 between the basic unit and the tuning unit.

b. To insure proper ventilation within the equipment, secure dummy panel MP1113 over the basic unit front panel opening created by the removal of the tuning unit.

c. Disconnect P1601 (P1701) from its mating receptacle on mixer assembly A1602 (A1702). Couple P1601 (P1701) to the input of a frequency meter as illustrated in figure 4-9.

d. Connect a PRD Model 613-M Crystal Detector between the output of the frequency meter and the vertical input of an oscilloscope, as illustrated in figure 4-9.

e. Connect the "reflector" terminals of a Polarad Model MK-1 Klystron Mode Alignment Modulator between TP1601 (TP1701) and TP1602 (TP1702). Connect the "h scope" and "grid" terminals of the modulator to the horizontal input of the oscilloscope. Rotate the modulator "amp" control fully counterclockwise.

Note

If the Model MK-1 Klystron Mode Alignment Modulator is not available, an equivalent unit can be constructed with the aid of the schematic diagram shown in figure 4-10.

f. Remove the protective phenolic plate which covers TB1603 (TB1703) and connect the "+" lead of a Simpson Model 260 Multimeter to pin 3. Connect the multimeter "common-" lead to TP1602 (TP1702). Set the multimeter to the +1000VDC range.

g. Set a second multimeter to the +2.5 VDC range. Connect the "+" lead to the junction of R1630 (R1730)

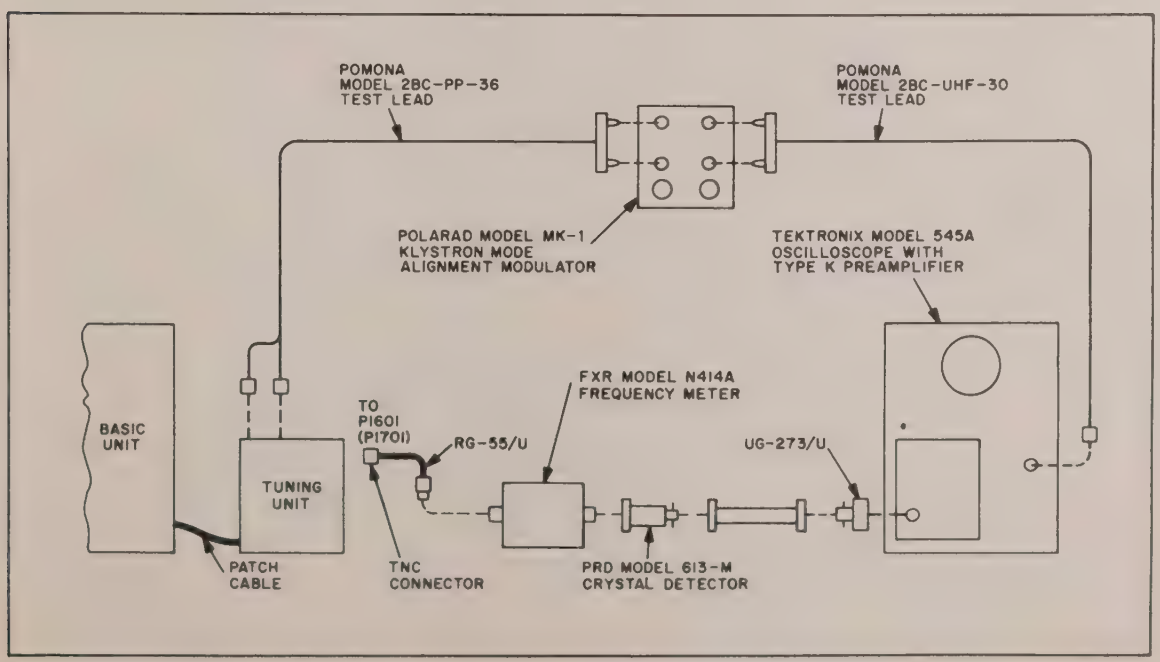


Figure 4-9. Retracking Local Oscillator, Equipment Setup

and R1626 (R1726). Connect the "common-" lead to the other side of R1630 (R1730).

h. With the AFC/OFF switch set to OFF, energize the equipment. Allow the Model TR to warm up for at least 15 minutes.

i. Set Bias Adj control R1601 (R1701) to obtain a reading of +0.8 volts (+0.8 volts) from the multimeter connected across R1630 (R1730).

j. Rotate the TUNING control to position the local oscillator cam follower at the fixed point of the adjustable-periphery tuning cam. See figure 4-11. Note the Frequency Gc counter indication; it should read approximately 12.40 (17.80).

k. Adjust the modulator "amp" control to obtain a mode display on the oscilloscope screen, as shown in figure 4-12a. Adjust the modulator "phase" control to superimpose the two traces so that they appear as a single trace, as illustrated in figure 4-12b.

l. Adjust Track 2 control R1609 (Track 1 control R1707) to center the mode on the oscilloscope screen, as shown in figure 4-12c. Note the multimeter indication; a reading within the limits of -70 and -115 (-260 and -340) volts signifies that the reflex klystron is oscillating in the desired 3-3/4 λ (3-3/4 λ) reflector mode. See figure 4-13 (figure 4-14).

m. Tune the frequency meter to position the "suck-out" point at the center of the displayed mode, as shown in figure 4-12d. Note the frequency meter reading; it should be equal to

$$f_{FM} = \frac{\text{Frequency Gc counter reading - 260 mc}}{2}$$

If it is not, continue as directed in the following additional steps.

1. Loosen the single cap screw which locks the setting of the push rod yoke in the drive collar.

2. Tune the frequency meter toward f_{FM} of step m. Note that the "suck-out" point moves to one side of the mode. Keep the "suck-out" point on the mode.

3. Carefully adjust the setting of the push rod yoke to reposition the "suck-out" point at the center of the displayed mode. Note that the display has shifted from the center of the oscilloscope screen.

4. Reset Track 2 control R1609 (Track 1 control R1707) to recenter the mode on the oscilloscope screen.

5. Repeat steps 2 through 4 until the "suck-out" point occurs at the center of the displayed mode with the frequency meter tuned to f_{FM} and the mode centered on the oscilloscope screen.

6. Carefully tighten the cap screw to fix the setting of the push rod yoke within the drive collar. Check the mode display to ascertain that tightening of the cap screw did not cause the "suck-out" point to shift.

n. Rotate the TUNING control to position each of the eight eccentric adjustment bolts, in turn, beside the local oscillator cam follower. At each setting of the TUNING control, tune the frequency meter to position the "suck-out" point at the center of the displayed mode. Note both the frequency meter and Frequency

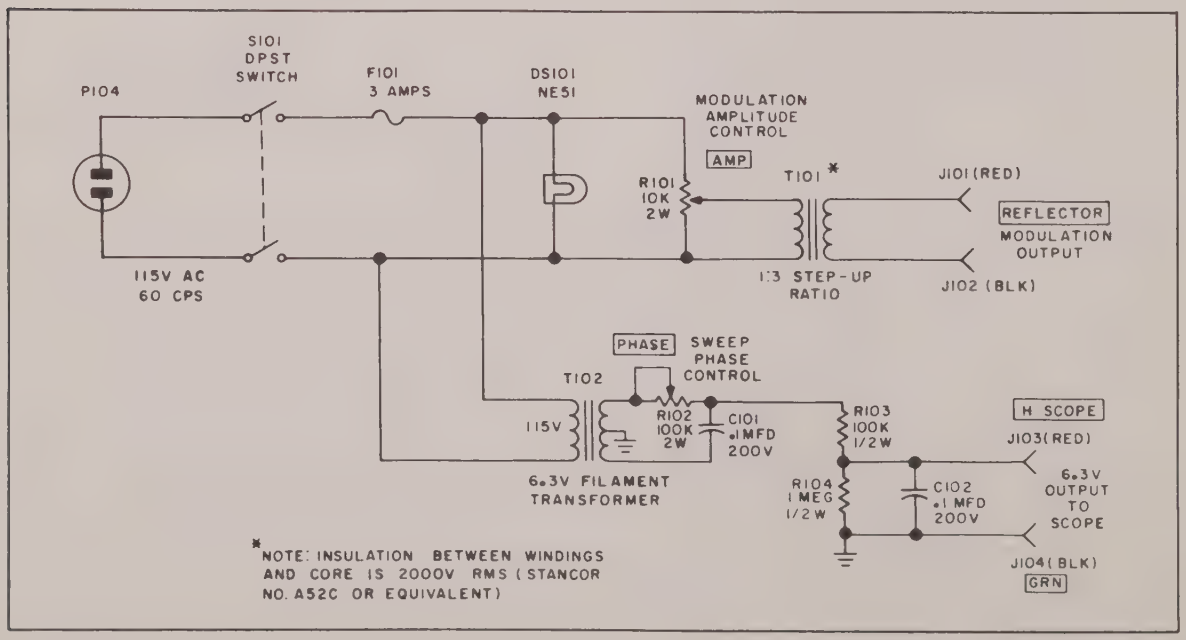


Figure 4-10. Model MK-1 Klystron Mode Alignment Modulator, Schematic Diagram

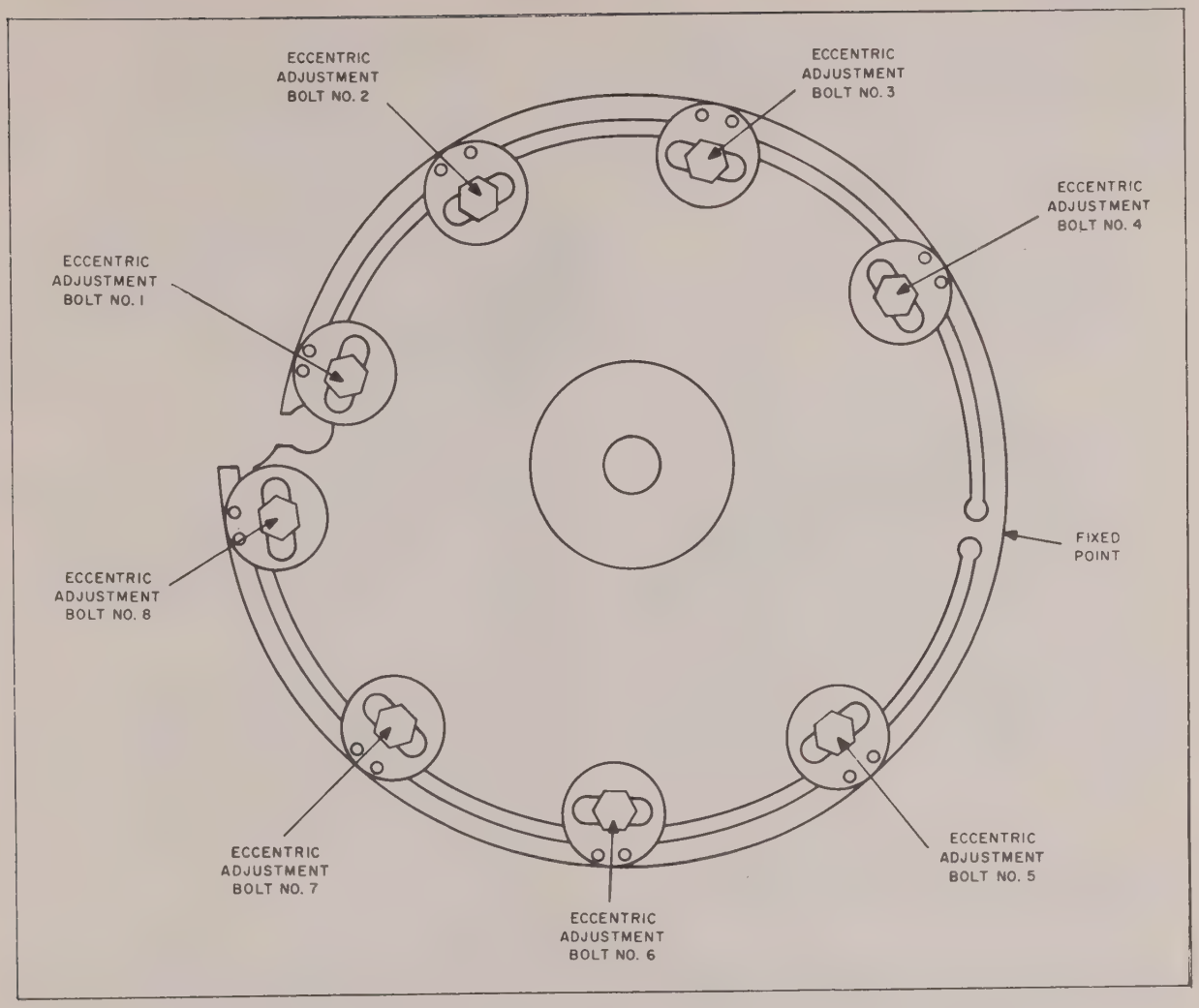

ECCENTRIC ADJUSTMENT BOLT NO. 2
ECCENTRIC ADJUSTMENT BOLT NO. 3
ECCENTRIC ADJUSTMENT BOLT NO. 4
ECCENTRIC ADJUSTMENT BOLT NO. 1
FIXED POINT
ECCENTRIC ADJUSTMENT BOLT NO. 8
ECCENTRIC ADJUSTMENT BOLT NO. 7
ECCENTRIC ADJUSTMENT BOLT NO. 5
ECCENTRIC ADJUSTMENT BOLT NO. 6

Figure 4-11. Typical Adjustable-Periphery Tuning Cam

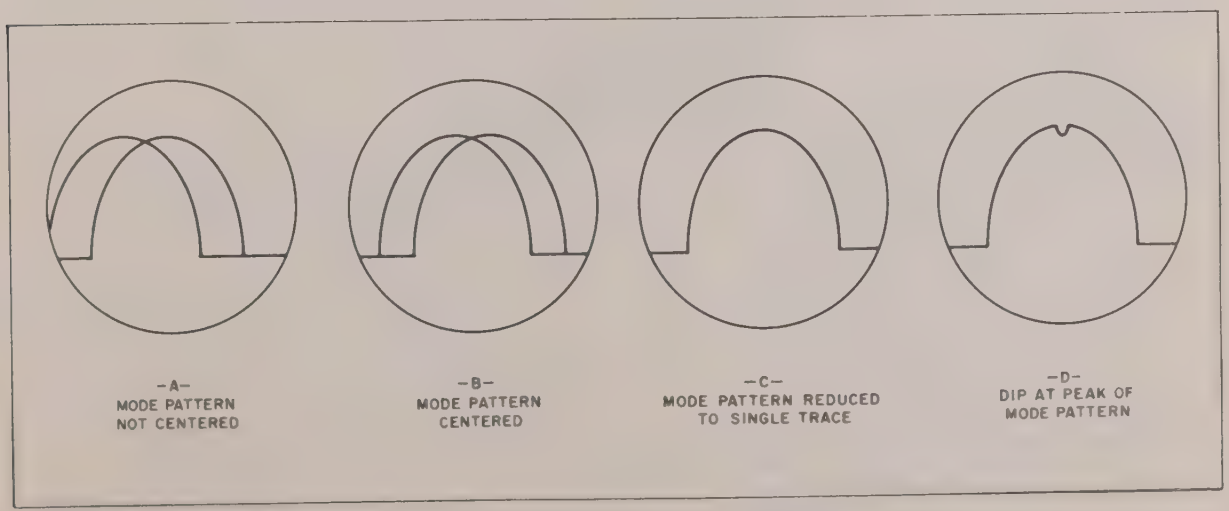


Figure 4-12. Typical Mode Displays

Gc counter indications. The frequency meter indication doubled should be within ±1% of the Frequency Gc counter indication at each setting of the TUNING control. If this accuracy cannot be obtained at all test points, continue as directed in the following additional steps.

CAUTION

ALWAYS WORK AWAY FROM THE FIXED POINT OF THE CAM WHEN RESETTING THE ECCENTRIC ADJUSTMENT BOLTS.

Note

If the error occurs at the high end of the band, loosen, in the order stated, the nuts that secure the settings of eccentric adjustment bolts Nos. 1, 2, 3, and 4 with a 5/16-inch open-end wrench. If the error occurs at the low end of the band, loosen, in the order stated, the nuts that secure the settings of eccentric adjustment bolts Nos. 8, 7, 6, and 5.

1. Rotate the TUNING control to position the eccentric adjustment bolt closest to the fixed point of the adjustable-periphery tuning cam at the local oscillator cam follower. Note the Frequency Gc counter indication and tune the frequency meter to one-half this indication less 130 mc.

2. Carefully place a 3/8-inch open-end wrench over the eccentric adjustment bolt and set the bolt to position the "suck-out" point at the center of the displayed mode.

3. While maintaining the bolt setting with the 3/8-inch wrench, carefully place a 5/16-inch open-end wrench over the adjustment bolt lock nut. Tighten the bolt and remove both wrenches.

4. Repeat steps 1 through 3 for the remaining eccentric adjustment bolts.

o. Rotate the TUNING control throughout the band and observe the mode display. The mode should be continuous, except at the mode switching point, and should not split.

Note

Should the mode be erratic at any point, set the TUNING control to the frequency of the discontinuity and remove line power from the equipment. Remove the protective shield from the end collar and loosen the latter with the spanner wrench. Gently twist the base of the reflex klystron tube clockwise approximately 30°. Tighten the end collar, replace the protective shield, apply line power to the equipment and rescan the band for discontinuities.

Since proper orientation of the reflex klystron tube cannot be anticipated, it is suggested that the twisting procedure be repeated in 30° increments until continuity throughout the band is achieved.

p. Rotate the TUNING control to obtain a Frequency Gc counter indication of 9.85 (14.80). Set Low Adj control R1604 (R1704), if necessary, to center the mode display on the oscilloscope screen. Note the multimeter indication; a reading within the limits of -150 and -240 volts (-140 and -210 volts) signifies that the reflex klystron is oscillating in the desired 2-3/4 λ (3-3/4 λ) reflector mode. See figure 4-13 (figure 4-14).

q. Rotate the TUNING control to obtain a Frequency Gc counter indication of 11.70 (17.80). Set Track 1 control R1607 (R1707), if necessary, to center the mode display on the oscilloscope screen. Note the multimeter indication; a reading within the limits of -260 and -360 volts (-260 and -340 volts) signifies that the reflex klystron is oscillating in the desired 2-3/4 λ (3-3/4 λ) reflector mode. See figure 4-13 (figure 4-14).

r. Rotate the TUNING control to obtain a Frequency Gc counter indication of 12.40 (18.50). Set Track 2 control R1609 (R1709), if necessary, to center the mode display on the oscilloscope screen. Note the multimeter indication; a reading within the limits of -70 and -115 volts (-125 and -220 volts) signifies that the reflex klystron is oscillating in the desired 3-3/4 λ (4-3/4 λ) reflector mode. See figure 4-13 (figure 4-14).

s. Rotate the TUNING control to obtain a Frequency Gc counter indication of 15.35 (21.00). Set High Adj control R1606 (R1706), if necessary, to center the mode display on the oscilloscope screen. Note the multimeter indication; a reading within the limits of -170 and -240 volts (-200 and -300 volts) signifies that the reflex klystron is oscillating in the desired 3-3/4 λ (4-3/4 λ) reflector mode. See figure 4-13 (figure 4-14).

Note

Due to interaction between these controls, it may be necessary to repeat steps p through s several times to maintain a display that remains centered on the oscilloscope screen.

t. Rotate the TUNING control throughout the band and note the displayed mode; it should remain centered on the oscilloscope screen as the TUNING control is rotated throughout the band.

u. Carefully tighten the shaft locknuts on each reflector voltage tracking potentiometer.

v. De-energize the equipment and disconnect from the setup of figure 4-9. Remove both multimeters.

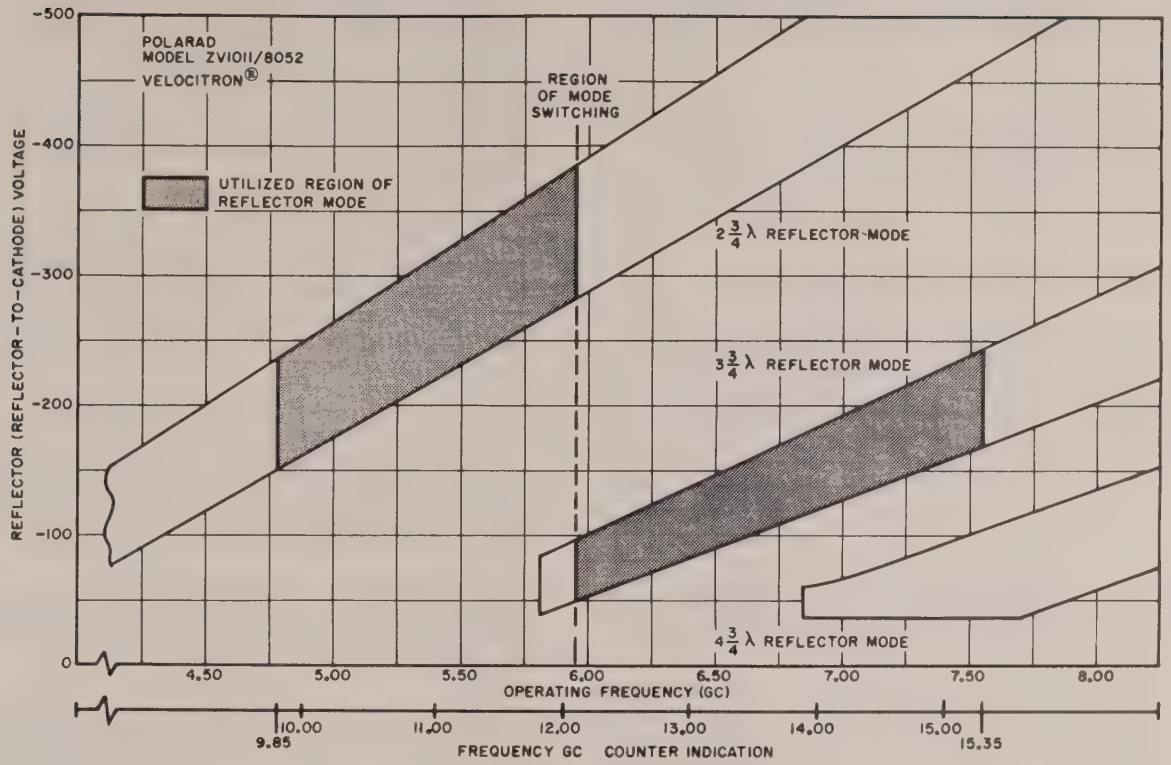


Figure 4-13. Typical Reflector Voltage-Frequency Characteristics, Local Oscillator V1601

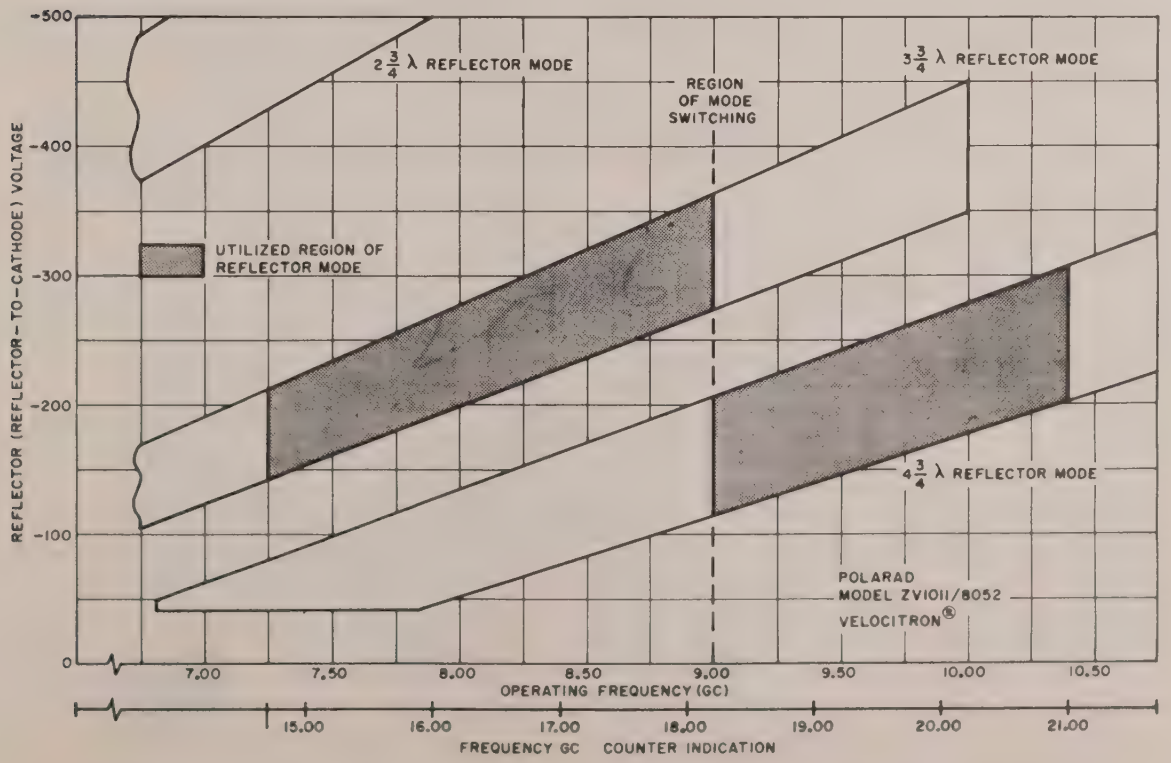


Figure 4-14. Typical Reflector Voltage-Frequency Characteristics, Local Oscillator V1701

w. Connect P1601 (P1701) to its mating receptacle on mixer assembly A1602 (A1702).

Note

Retracking the local oscillator will necessitate retracking of the preselector. Refer to paragraph 4-16.

4-16. RETRACKING PRESELECTOR.

4-17. Replacement of the local oscillator reflex klystron tube and/or low equipment sensitivity will necessitate retracking the preselector. The proper tracking procedure, which is described in the following steps, assumes that the local oscillator has been tracked in accordance with paragraph 4-14.

Note

The information contained within parenthesis applies to the T-RKU, and immediately follows the data applicable to the T-RKS.

a. With the Model TR installed in its dust cover and with line power removed from the equipment, remove the tuning unit from the basic unit and connect patch cable W35 between the basic unit and the withdrawn tuning unit.

b. To insure proper ventilation within the equipment, secure dummy panel MP1113 over the basic unit front panel opening created by the removal of the tuning unit.

c. Rotate the TUNING control to obtain a Frequency Gc counter indication of 15.35 (21.00).

d. With the technician facing the adjustable-periphery tuning cam side of the tuning unit, set each of the preselector fine tuning adjustment screws so that they protrude 3/16 of an inch above the surface of the casting.

e. Cut a 10-inch length of 3/16-inch diameter copper rod and face off one end of the rod. Scribe three marks on the rod: the first mark 2-25/64 inches (2-55/64 inches) from the faced end; the second mark 2-49/64 inches (3-9/64 inches) from the faced end; and the third mark 3-5/32 inches (3-27/64 inches) from the faced end.

CAUTION

DO NOT USE FORCE WHEN SLIDING THE COPPER ROD INTO THE PRESELECTOR CAVITIES.

f. Insert the faced end of the copper rod into the open end of the preselector cavity closest to the technician. Slide the rod into the cavity until it contacts the tuning plunger.

g. Carefully set preselector coarse tuning adjustment cap screw No. 1, shown in figure 4-15, so that the scribed mark furthest from the faced end of the rod is flush with the open end of the preselector cavity. Remove the rod.

h. Insert the faced end of the rod into the open end of the middle preselector cavity. Slide the rod into the cavity until it contacts the tuning plunger.

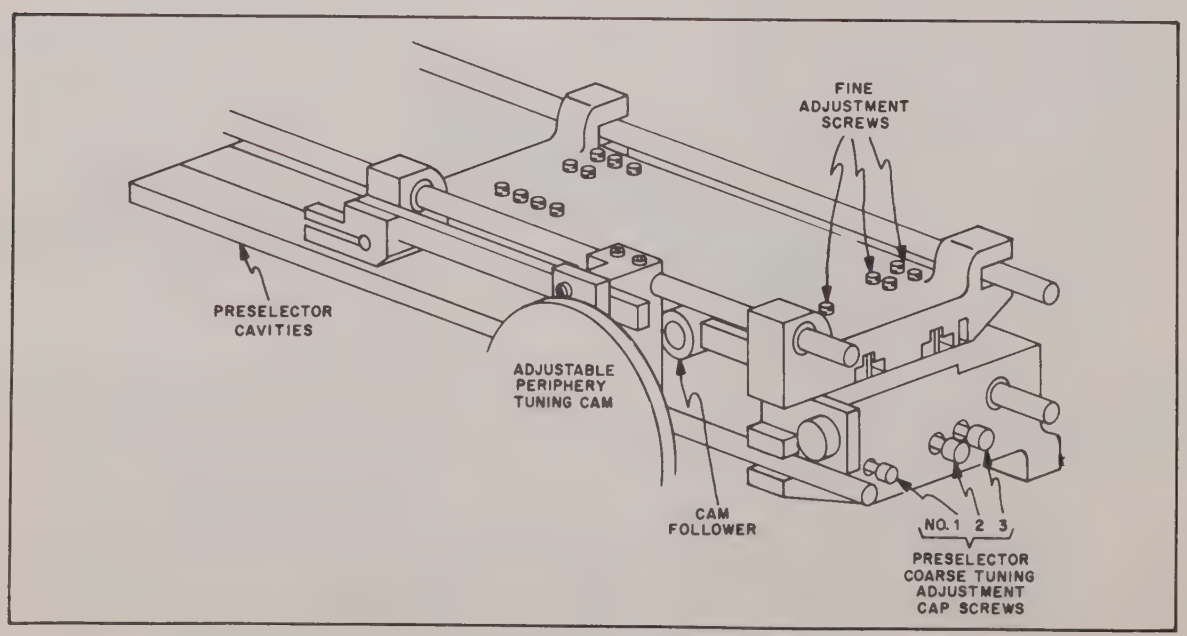


Figure 4-15. Location of Preselector Coarse Tuning Adjustment Cap Screws.

i. Carefully set preselector coarse tuning adjustment cap screw No. 2, shown in figure 4-15, so that the middle scribe mark of the rod is flush with the open end of the preselector cavity. Remove the rod.

j. Insert the faced end of the rod into the open end of the preselector cavity furthest from the technician. Slide the rod into the cavity until it contacts the tuning plunger.

k. Carefully set preselector coarse tuning adjustment cap screw No. 3, shown in figure 4-15, so that the scribed mark closest to the faced end of the rod is flush with the open end of the preselector cavity. Remove the rod.

l. With the controls set as listed in table 4-2, apply line power to the equipment. Energize the Model TR and allow a 15 minute warmup. Set the Scale Selector switch to LIN. Adjust the IF GAIN control to obtain an Output meter pointer indication of 2 on the LIN scale.

m. Rotate the TUNING control to position the preselector tape cam followers beneath the nearest set of fine tuning adjustment screws. See figure 4-4.

n. Adjust a microwave signal generator for a cw signal at the frequency indicated on the Frequency Gc counter. Adjust the signal generator output level to approximately -50 dbm and connect the equipment as illustrated in figure 4-1b.

o. Rock the signal generator tuning control to obtain a maximum output meter indication.

Note

If the output meter pointer does not deflect upscale as the signal generator is rocked, increase the signal generator output level and repeat step o.

p. At the frequency of maximum Output meter pointer deflection adjust, in turn, preselector coarse tuning adjustment cap screws No. 1, 2, and 3 to maximize the Output meter indication. Run through this step several times.

q. Rotate the TUNING control counterclockwise to position the preselector tape cam followers directly beneath the next set of fine tuning adjustment screws.

r. Adjust the microwave signal generator for a cw signal at the frequency indicated on the Frequency Gc counter. Rock the signal generator tuning control to obtain a maximum Output meter indication.

s. At the frequency of maximum Output meter pointer deflection adjust, in turn, the three preselector fine tuning adjustment screws to maximize the Output meter indication. Run through this step several times.

t. Repeat steps q through s for the remaining sets of preselector fine tuning adjustment screws.

u. After the preselector has been aligned, determine the sensitivity at various points within the band, as described in table 4-3. If the sensitivity is low, re-adjustment of the preselector or alignment of the mixer matching network will be required.

4-18. ALIGNING MIXER MATCHING NETWORK.

4-19. To align the mixer matching network, proceed as directed in the following steps.

a. Rotate the TUNING control to obtain a Frequency Gc counter indication of 15.35 (21.00).

b. Set the WEIGHTING FUNCTION switch to AVG, the IMPULSE BANDWIDTH-MC switch to 1, the Scale Selector switch to LIN, and push the PULL-CAL PUSH-USE switch toward the tuning unit front panel. Remove all attenuation, both r-f and i-f, from the system.

c. Connect a Polarad Model 1709 (1710) Microwave Signal Generator to the RF INPUT flange. Adjust the signal generator for minimum output power.

d. Adjust the IF GAIN control to obtain an output meter indication of 2.0 on the LIN scale.

e. Tune the signal generator to the frequency indicated on the Frequency Gc counter and adjust the generator for a cw output level of approximately -70 dbm. Fine tune the generator to obtain a maximum Output meter indication.

Note

If the Output meter indication goes off-scale, reduce the signal generator output level.

f. Adjust the signal generator output level to obtain an Output meter indication of 2.8 on the LIN scale.

g. Note the signal generator output level; it should be equal to or less than -80 dbm (-77 dbm). If the signal level required for an Output meter indication of 2.8 is greater than -80 dbm (-77 dbm), adjust Xtal cur control R2001 to increase the Output meter indication and repeat steps c through g until the specified sensitivity is achieved.

h. Repeat steps c through g with the receiver tuned to various frequencies within the band. It may be necessary to compensate the setting of Xtal cur control R2001 to obtain the specified sensitivity throughout the band.

4-20. SETTING IMPULSE GENERATOR OUTPUT LEVEL.

4-21. To set the output level of the impulse, proceed as directed in the following steps.

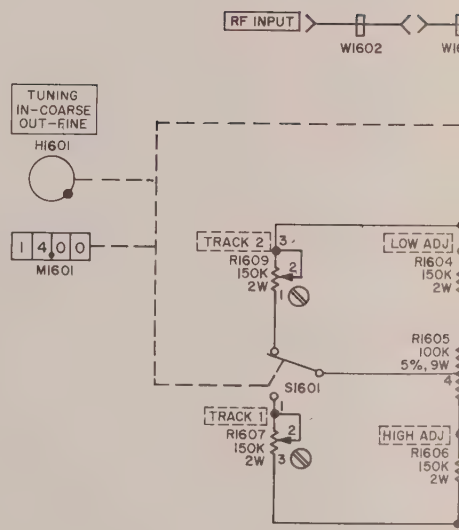
SECTION V

SCHEMATIC DIAGRAMS

5-1. GENERAL.

5-2. This section contains the schematic diagrams of the Models T-RKS and T-RKU Tuning Units. These diagrams are to be employed in conjunction with Sections III and IV to help the technician understand the operation of the equipment and to facilitate repair operations, respectively.

POLARAD DRAWING NO. D150818
MODEL T-RKS TUNING UNIT SERIAL NOS. 1-1 AND UP



NOTES:

ALL VALUES ARE EXPRESSED IN MICRO-MICROFARADS (U
MICROHENRIES (UH), AND OHMS UNLESS SUFFIXED BY K F

RESISTORS ARE RATED AT ±10%, 1/2 WATT, UNLESS OTHERWISE INDICATED.

▭ INDICATES EQUIPMENT FRONT PANEL MARKING.

⊏⊐⊐⊐ INDICATES EQUIPMENT INTERNAL MARKING.

⊘ INDICATES SCREWDRIVER ADJUSTMENT.

MODE SWITCH POSITION SHOWN CORRESPONDS TO FREQU
HIGH END OF BAND. SWITCHING OCCURS AT DIAL INDICAT
OF APPROXIMATELY 12.10.

*EMPLOYED ONLY IN UNITS INCORPORATING MOTOR DRIVE.

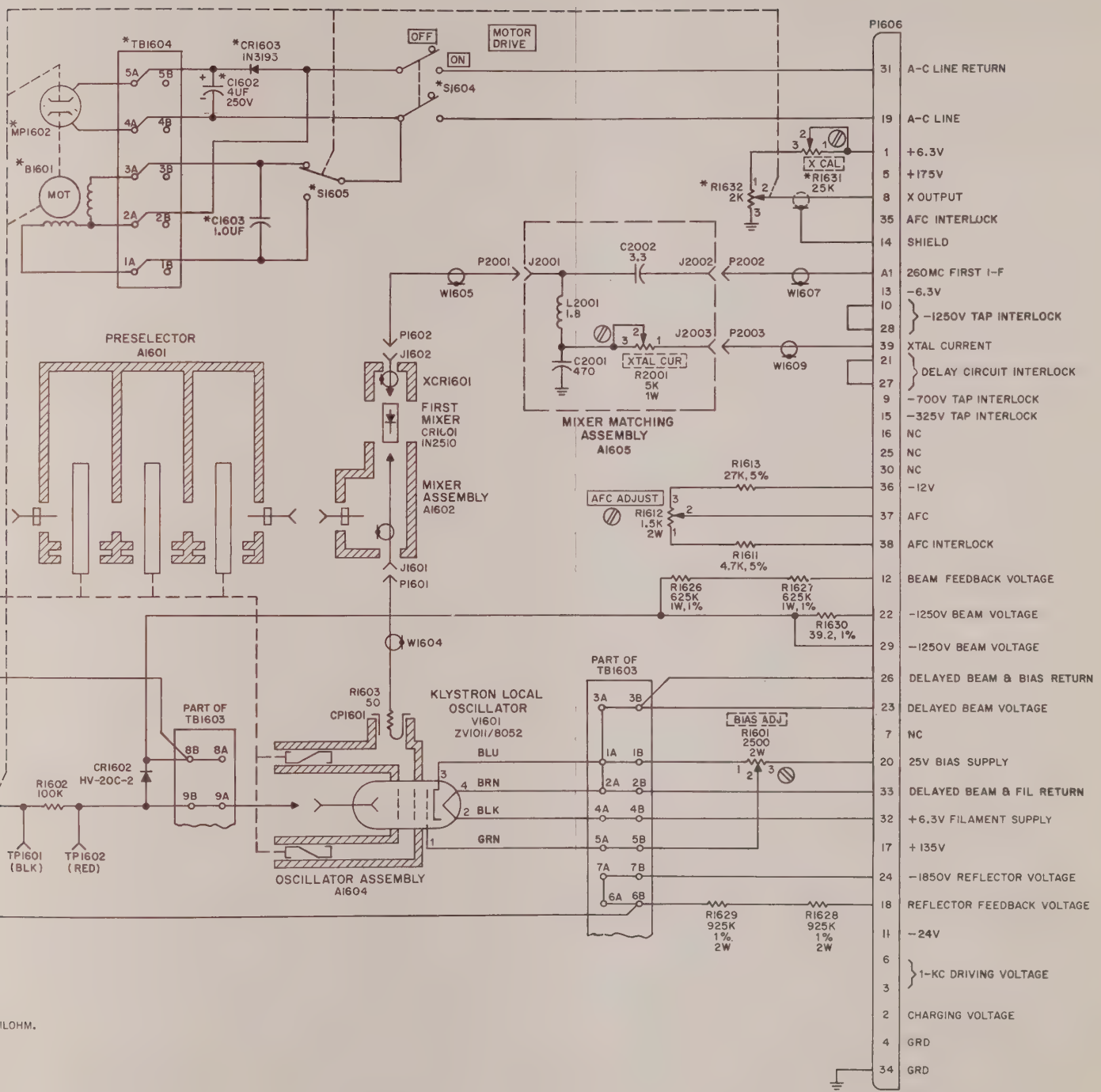
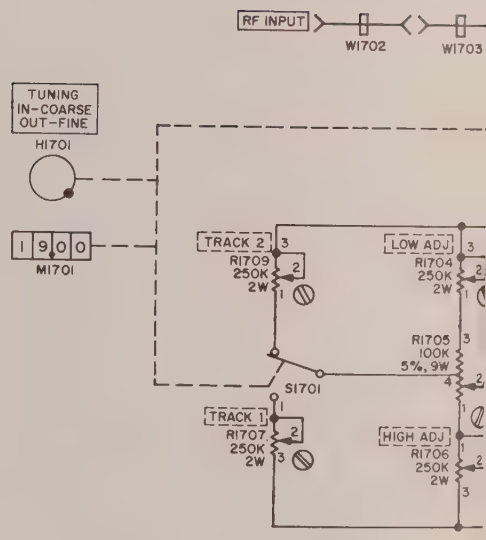


Figure 5-1. Model T-RKS Tuning Unit, Schematic Diagram

POLARAD DRAWING NO. D150819
MODEL T-RKU TUNING UNIT SERIAL NOS. 1-1 AND UP.



NOTES:

ALL VALUES ARE EXPRESSED IN MICRO-MICROFARADS (UUF), MICROHENRIES (UH), AND OHMS UNLESS SUFFIXED BY K FOR

RESISTORS ARE RATED AT ±10%, 1/2 WATT, UNLESS OTHERWISE INDICATED.

▭ INDICATES EQUIPMENT FRONT PANEL MARKING.

▭ INDICATES EQUIPMENT INTERNAL MARKING.

⊘ INDICATES SCREWDRIVER ADJUSTMENT.

MODE SWITCH POSITION SHOWN CORRESPONDS TO FREQUENC HIGH END OF BAND. SWITCHING OCCURS AT DIAL INDICATION OF APPROXIMATELY 18.00.

*EMPLOYED ONLY IN UNITS INCORPORATING MOTOR DRIVE.

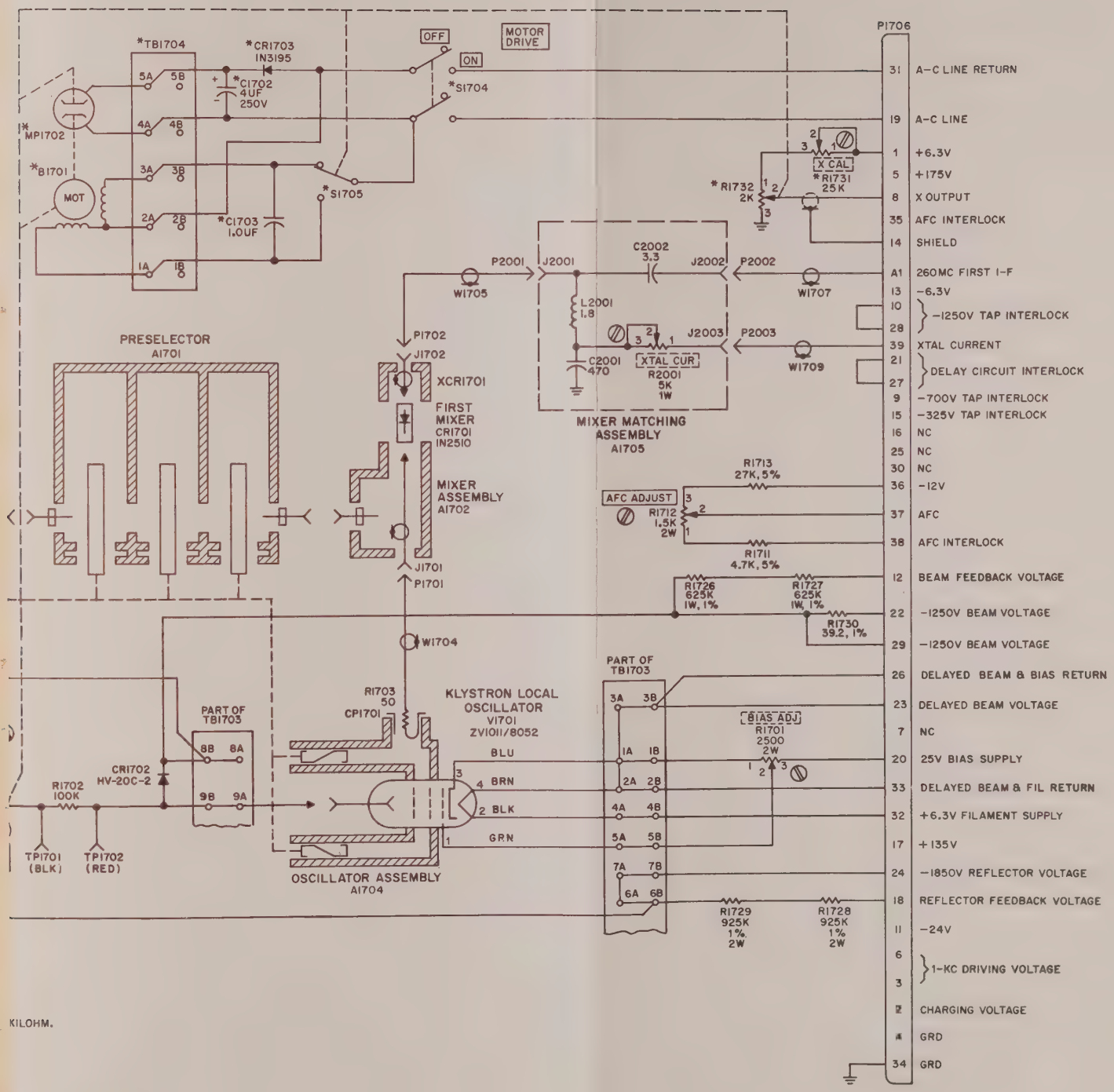


Figure 5-2. Model T-RKU Tuning Unit, Schematic Diagram

SECTION VI
PARTS LIST

6-1. INTRODUCTION.

6-2. This parts list provides an alpha-numerical listing, in reference symbol sequence of the replaceable electrical, certain electro-mechanical, and mechanical parts of the equipment.

6-3. ORDERING INFORMATION. Orders for parts should contain the following information:

a. Equipment name and model.
b. Serial number.
c. Reference symbol of part.
d. Manufacturer's part number and code.

6-4. HOW TO USE THE PARTS LIST.

6-5. An explanation of the structure of the parts list, Table 6-2, and the meaning of the entries in the five columns are given in the following paragraphs. (See Figure 6-1.)

1 2 3 4 5 6 7

TABLE 6-2. PARTS LIST

SECTION VI
PARTS LIST

REF SYMBOL	DESCRIPTION	MANUFACTURER'S PART NUMBER	MFR'S CODE	MAINT QTY
C101	CAPACITOR, CERAMIC, 2000UUF, 10 PCT, 500WVDC /POLARAD PART NO. B704888	BCD-D1-4	FY	1
C102	NOT USED			
C103 AND C104	SAME AS C101			
S101 THRU S104	SWITCH, ROTARY, 4 SECT, 6 WAFERS, 6 POSITIONS	C23346	BE	1
TB101	TERMINAL BOARD, COMPONENT ASSY	C115625	BE	1
W108	CABLE ASSY, RF	C147158	BE	1
XF101 AND XF102	FUSEHOLDER/POLARAD PART NO. 005236	HKP-HW	EG	1
XV101 THRU XV106	SOCKET, ELECTRON TUBE	TS101P01	AU	1
V101	ELECTRON TUBE	6021	CK	2

Figure 6-1. Parts List Example

6-6. REFERENCE SYMBOL COLUMN. The reference symbol column (1, Figure 6-1) contains the reference symbol assigned to each part, which also identifies the part on the schematic diagram or in an illustration. The listing is in alpha-numerical order.

6-7. DESCRIPTION COLUMN. The description column (2) contains the description for each part. When the same part is used more than once in the equipment, the second and subsequent listings for that part use the phrase "SAME AS___" (4) in the description column and the remaining columns (5, 6, and 7) are left blank. When a reference symbol designation has not been used or its assignment has been cancelled, the description column contains the phrase "NOT USED" (3).

6-8. MANUFACTURER'S PART NUMBER COLUMN. The manufacturer's part number column (5) contains the part number assigned by the manufacturer of the part, except for "SAME AS___" and "NOT USED" listings.

6-9. MANUFACTURER'S CODE COLUMN. The manufacturer's code column (6) contains a letter code identifying the manufacturer of the part. Table 6-1 contains a listing of the letter codes and the manufacturers names and addresses.

6-10. MAINTENANCE QUANTITY COLUMN. The maintenance quantity column (7) contains the recommended maintenance quantity for each part, based on a one year requirement for an equipment in operation for 10 hours a day throughout the year. The recommended maintenance quantities will provide a high degree of equipment reliability in areas where an adequate supply of replacement parts is not available. The recommended maintenance quantity is listed for the initial occurrence of the part in the parts list, but covers all subsequent listings.

6-11. To determine recommended maintenance quantity for periods other than one year, multiply the one-year quantity by the desired period, expressed in years.

6-12. To determine recommended maintenance quantity for operating periods other than 10 hours per day, use the equation given below.

$$MQ' = \frac{MQ \times HR_{op}}{10}$$

where: MQ = Maintenance quantity from Table 6-2

MQ' = Maintenance quantity for desired operating period

HR_{op} = Operating period in hours

Round off the quantity obtained to the nearest whole number.

TABLE 6-1. MANUFACTURER'S CODE

CODE	NAME AND ADDRESS
D	Allen-Bradley Co., Milwaukee, Wis.
S	Clarostat Mfg. Co., Inc., Dover, N. H.
Y	Erie Resistor Corp., Erie, Pa.
AU	Military Specifications
BE	Polarad Electronics Corp., Long Island City, N. Y.
BH	Raytheon Co., Industrial Components Division, Industrial Tube Operation, Newton, Mass.
BN	Sprague Electric Co., North Adams, Mass.
CC	Winchester Electronics Co., Inc., Norwalk, Conn.
CD	Cutler-Hammer, Inc., Milwaukee, Wis.
CF	Cannon Electric Co., Los Angeles, Calif.
CK	Commercially Available Component
CL	Stackpole Carbon Co., St. Marys, Pa.
CM	Astron Co., East Newark, N. J.
EA	Automatic Metal Products Co., Brooklyn, N. Y.
EZ	E. F. Johnson Co., Waseca, Minn.
FD	Kulka Electric Corp., Mount Vernon, N. Y.
FX	Weston Instruments, Division of Daystrom, Inc., Newark, N. J.
GJ	Solitron Devices, Inc., Norwood, N. J.
KR	Grayhill, Inc., La Grange, Ill.
KU	Globe Industries, Inc., Dayton, Ohio
MN	Autotronics Inc., Florissant, Mo.

TABLE 6-2. PARTS LIST

REF SYMBOL	DESCRIPTION	MANUFACTURER'S PART NUMBER	MFR'S CODE	MAINT QTY
	MODELS T-RKS AND T-RKU TUNING UNITS			
A1601	PRESELECTOR ASSY	B147563	BE	1
A1701	PRESELECTOR ASSY	B147564	BE	1
A1602	MIXER ASSY	B147717	BE	1
A1702	MIXER ASSY	B147686	BE	1
A1603	NOT USED			
A1703	NOT USED			
A1604	OSCILLATOR ASSY	C147644	BE	1
A1704	OSCILLATOR ASSY	C147657	BE	1
A1_05	MIXER MATCHING ASSY	B150771	BE	1
A1_06	NOT USED			
B1_01	MOTOR/POLARAD PART NO. B710888	33A643-4126	KU	1
CP1601	ADAPTER, WAVEGUIDE	B147723	BE	1
CP1701	ADAPTER, WAVEGUIDE	B147722	BE	1
CR1_01	SEMICONDUCTOR DEVICE, DIODE, CRYSTAL	1N2510	CK	1
CR1_02	SEMICONDUCTOR DEVICE, DIODE /POLARAD PART NO. B710666	HV-20C-2	GJ	1
CR1_03	SEMICONDUCTOR DEVICE, DIODE /USED ON MOTOR DRIVE ONLY	1N3195	CK	1
C1_01	NOT USED			
C1_02	CAPACITOR, ELECTROLYTIC, 4UF, 250VDCW /POLARAD PART NO. B511318 /USED ON MOTOR DRIVE ONLY	TVA-1501	BN	1
C1_03	CAPACITOR, PAPER, 1UF, 20 PCT, 200WVDC /POLARAD PART NO. A701476 /USED ON MOTOR DRIVE ONLY	MQC-2-1M-A	CM	1
C2001	CAPACITOR, MICA, 500UUF, 10 PCT, 500WVDC /POLARAD PART NO. B706816 /USED ON T-RKS AND T-RKU	370FC501K	Y	1
C2002	CAPACITOR, CERAMIC, 3.3UUF, 10 PCT, 500WVDC /POLARAD PART NO. A701928 /USED ON T-RKS AND T-RKU	GA-3.3UUF10PCT	CL	1
H1_01	KNOB/MODIFIED AK PART NO. K1375	A148621	BE	1
J1_01	NON-REPLACEABLE PART OF A1602, A1702			
J1602	CONNECTOR, RECEPTACLE, FEMALE, TNC TYPE /NON-REPLACEABLE PART OF A1602			1
J1702	CONNECTOR, RECEPTACLE, FEMALE, TNC TYPE /NON-REPLACEABLE PART OF A1702			1

TABLE 6-2. PARTS LIST (CONT'D)

REF SYMBOL	DESCRIPTION	MANUFACTURER'S PART NUMBER	MFR'S CODE	MAINT QTY
J2001	CONNECTOR, RECEPTACLE, FEMALE, BNC TYPE /USED ON T-RKS AND T-RKU	UG1098/U	AU	1
J2002	SAME AS J2001			
J2003	CONNECTOR, RECEPTACLE, FEMALE, BSM TYPE /POLARAD PART NO. A701522 /USED ON T-RKS AND T-RKU	RF-0750	EA	1
L2001	COIL, RF, 1.8UH/USED ON T-RKS AND T-RKU	A21248	BE	1
MP1_02	CLUTCH/POLARAD PART NO. B710886 /USED ON MOTOR DRIVE ONLY	C-10-19	MN	1
M1_01	COUNTER, ROTATING	B141985	BE	1
P1_01	CONNECTOR, PLUG/POLARAD PART NO. A707496	100-T1000	EA	1
P1_02	SAME AS P1_01			
P1_04 AND P1_05	NOT USED			
P1_06	CONNECTOR, PLUG, MALE, 40 PINS /POLARAD PART NO. B703158	DPX-J40C1-34P	CF	1
P2001 AND P2002	CONNECTOR, PLUG, MALE, BNC TYPE	UG88C/U	AU	1
P2003	CONNECTOR, PLUG, MALE, BSM TYPE /POLARAD PART NO. A701861	CBWT-RF-0721-70	EA	1
R1_01	RESISTOR, VARIABLE, COMPOSITION, 2.5K, 10 PCT, 2W/POLARAD PART NO. 517845	JA2N056S252UA	D	1
R1_02	RESISTOR, COMPOSITION, 100K, 10 PCT, 1/2W /MIL STD PART NO. MS35043-25	RC20GF104K	AU	1
R1_03	RESISTOR, FILM, FIXED, 50 OHMS, 10 PCT, 1/2W /NON-REPLACEABLE PART OF W1_04	A143729	BE	1
R1604	RESISTOR, VARIABLE, COMPOSITION, 150K, 10 PCT, 2W/POLARAD PART NO. 517924	JA2N056S154UA	D	1
R1704	RESISTOR, VARIABLE, COMPOSITION, 250K, 10 PCT,2W	JA2N056S254UA	D	1
R1_05	RESISTOR, VARIABLE, 100K, 5 PCT, 9W /MODIFIED DS PART NO. 974R	B114392	BE	1
R1606 AND R1607	SAME AS R1604			
R1706 AND R1707	SAME AS R1704			
R1608	NOT USED			
R1609	SAME AS R1604			
R1709	SAME AS R1704			
R1_10	NOT USED			
R1_11	RESISTOR, COMPOSITION, 4.7K, 5 PCT, 1/2W	RC20GF472J	AU	1

TABLE 6-2. PARTS LIST (CONT'D)

REF SYMBOL	DESCRIPTION	MANUFACTURER'S PART NUMBER	MFR'S CODE	MAINT QTY
R1_12	RESISTOR, VARIABLE, COMPOSITION, 1.5K, 10 PCT, 2W/POLARAD PART NO. 517844	RV4NAYSD152A	AU	1
R1_13	RESISTOR, COMPOSITION, 27K, 5 PCT, 1/2W /MIL STD PART NO. MS35043-121	RC20GF273J	AU	1
R1_14 THRU R1_25	NOT USED			
R1-26 AND R1_27	RESISTOR, FILM, 625K, 1 PCT, 1W	9850-2-625K	FX	1
R1_28 AND R1_29	RESISTOR, FILM, 925K, 1 PCT, 2W /POLARAD PART NO. A705429	9849-2-925K	FX	1
R1_30	RESISTOR, FILM, 39.2 OHMS, 1 PCT, 1/2W	RN20X39R2F	AU	1
R1_31	RESISTOR, VARIABLE, COMPOSITION, 25K, 10 PCT, 1/2W/USED ON MOTOR DRIVE ONLY	RV6LAYSA253A	AU	1
R1_32	RESISTOR, VARIABLE, COMPOSITION, 2K, 5 PCT, 2W/POLARAD PART NO. A710417 /USED ON MOTOR DRIVE ONLY	62JA-2K	S	1
R2001	RESISTOR, VARIABLE, COMPOSITION, 5K, 10 PCT, 1W /USED ON T-RKS AND T-RKU	RV6LAYSA502A	AU	1
S1_01	SWITCH, MICRO	AP20438	BE	1
S1_04 AND S1_05	SWITCH, TOGGLE/POLARAD PART NO. B703121 /USED ON MOTOR DRIVE ONLY	8373K7	CD	1
TB1601	TERMINAL BOARD, COMPONENT ASSY	B148346	BE	1
TB1701	TERMINAL BOARD, COMPONENT ASSY	B148341	BE	1
TB1_02	NOT USED			
TB1_03	TERMINAL BOARD/POLARAD PART NO. B704564	600-9	FD	1
TB1_04	TERMINAL BOARD/POLARAD PART NO. B704560 /USED ON MOTOR DRIVE ONLY	600-5	FD	1
TB1_05	NOT USED			
TB1607	TERMINAL BOARD, COMPONENT ASSY	B148349	BE	1
TB1707	TERMINAL BOARD, COMPONENT ASSY	B148340	BE	1
TP1_01	JACK, TEST POINT, BLACK /POLARAD PART NO. B700820	105-203-200	EZ	1
TP1_02	JACK, TEST POINT, RED /POLARAD PART NO. B700819	105-202-200	EZ	1
V1_01	ELECTRON TUBE, KLYSTRON	ZV1011/8052	BE	1
W1602	WAVEGUIDE ASSY	B148177	BE	1
W1702	WAVEGUIDE ASSY	B148176	BE	1
W1603	WAVEGUIDE ASSY	B148167	BE	1
W1703	WAVEGUIDE ASSY	B148166	BE	1

TABLE 6-2. PARTS LIST (CONT'D)

REF SYMBOL	DESCRIPTION	MANUFACTURER'S PART NUMBER	MFR'S CODE	MAINT QTY
W1_04 AND W1_05	CABLE AND PROBE ASSY	C148403	BE	1
W1_07	SAME AS W1_04			
W1_09	SAME AS W1_04			
XCR1_01	HOLDER, CRYSTAL/NON-REPLACEABLE PART OF W1_05			
	OPTIONAL ACCESSORIES			
CA-KS	CALIBRATED HORN ANTENNA, 9.85-15.35GC	C143957	BE	1
CA-KU	CALIBRATED HORN ANTENNA, 14.75-21.0GC	C148061	BE	1
CA-KSO	CALIBRATED OMNI ANTENNA, 9.85-15.35GC	C148050	BE	1
CA-KUO	CALIBRATED OMNI ANTENNA, 14.75-21.0GC	C143947	BE	1
WKS	FLEXIBLE WAVEGUIDE, 9.85-15.35GC	B701778	BE	1
WKU	FLEXIBLE WAVEGUIDE, 14.75-21.0GC	B701779	BE	1
CA-R2	ANTENNA REFLECTOR, 4.19-21.0GC	D143090	BE	1
CA-T	TRIPOD	A117208	BE	1

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REQUEST FOR MAINTENANCE

FROM:

COMPANY NAME _____ DATE: _____

ADDRESS: _____ INDIVIDUAL _____

_____ POSITION _____

SECTION OR DIVISION _____ PHONE NO. _____ EXT. _____

EQUIPMENT _____ DATE OF PURCHASE _____

MODEL _____ SERIAL NO. _____ ORDER NO. _____

TROUBLE REPORT:

A. Description of trouble _____

B. Has trouble been localized? _____ If so, how and where: _____

C. Instruments used and measurements taken, if any: _____

_____

_____

_____

D. Is trouble intermittent? _____

E. Hours of operation prior to this trouble _____

F. Date trouble occurred _____

G. Was factory consulted by telephone or letter prior to this request? _____

If so, give date and person to whom directed: _____

_____

H. Additional Comments: _____

_____

_____

_____

_____

_____

_____

When trouble develops requiring factory assistance, complete this form and send to:

Polarad Electronic Instruments
Division of
Polarad Electronics Corporation
34-02 Queens Boulevard
Long Island City 1, New York
ATTENTION: Service Department

After this report has been analyzed by the Service Department, you will be notified when a field service engineer will call on you to make the necessary repairs. If your trouble can best be corrected at the factory, we will so notify you with instructions and authorization for returning the equipment.

NO EQUIPMENT MAY BE RETURNED TO THE FACTORY WITHOUT WRITTEN AUTHORIZATION

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